CHAIN SAW TRAINING GUIDE

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

CHAIN SAW TRAINING GUIDE

WALLOWA-WHITMAN NATIONAL FOREST

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TRAINING AND CERTIFICATION PROCEDURES

This Guide will be used to train and certify the three classes of fallers as defined in Supplement 27. A Chain Saw Training Time Line has been included to facilitate organizing the training and certification (Exhibit 1).

The people responsible to schedule, coordinate and conduct training and certification of fallers are listed below by class.

Class A An Area Instructor will schedule, coordinate, and conduct the training.

Class B Same as Class A.

Class C The Forest Safety Officer will schedule and coordinate the certification. An Area Instructor and a Professional Faller with demonstrated instructor skills will conduct the certification.

The Area Instructor will assure a Record of Training is filled out and filed for each person who successfully completes the training or certification.

People who successfully complete the training or certification will be issued a Chain Saw Operators Qualification Card, WW 6700-1, (Exhibit 2). Class A and B ratings are valid indefinitely. Class C ratings are valid for 3 years at which time the individual will need to be certified again as outlined in WW-212C.

The Approving Instructor block on the card will be signed by an Area Instructor. The Approving Official block will be signed by a District Ranger or Program Manager.

CHAIN SAW TRAINING TIME LINE

COURSE DATES _____

Item No.	Items to Complete	Time Sequence	Assigned Dates	Completed
1.	Select and obtain approval for field exercise area.	4 weeks		
2.	Reserve class room space	4 weeks		
3.	Select instructors	4 weeks		
4.	Request for instructors assistance	4 weeks		
5.	Contact instructors to clarify assignments	3 weeks		
6.	Request from instructors visual aid work or duplication	2 weeks		
7.	Request equipment needs from instructors	2 weeks		
8.	Finalize trainee names	2 weeks		
9.	Notify trainees and send trainee packets	2 weeks		
10.	Return visual aids to instructors	1 week		
11.	Check on room, transportation and equipment	1 week		
12.	Meet with instructors	2 days		
13.	Present course	- 0 -		
14.	Complete post course tasks--return equipment, correct tests, issue qualification cards, etc.	1 week		

NOTES:

CHAIN SAW OPERATORS QUALIFICATION CARD

CHAIN SAW OPERATORS QUALIFICATION CARD		
AGENCY STATE REGION	DATE ISSUED DATE EXPIRES	UNIT
NAME		
RATING		
RESTRICTIONS		
APPROVING INSTRUCTOR		
APPROVING OFFICIAL		TITLE

CLASS A. INEXPERIENCED OPERATOR - Limited to felling & bucking of material under eight inches in diameter.

CLASS B. TRAINEE FALLER - Limited to felling & bucking of materials under twenty-four inches in diameter.

CLASS C. FULLY QUALIFIED FALLER - Journeyman skilled in felling & bucking materials over twenty-four inches in diameter.

WW 6700-1

CHAIN SAW TRAINING (WW-212A)

Course Agenda

Unit		
Introduction	.1/2	hour
Components	.1	hour
Field Maintenance	.1/2	hour
Basic Operation	.1/2	hour
Field Practices	.1	hour
Maintenance Practical Application	.1/2	hour
Field Exercise and Field Examination	.2	hours
Written Examination and Course Wrap-up	.1/2	hour

The unit on Field Maintenance may be covered in conjunction with the unit on Components.

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212A) TYPE : Lecture, Slide-Tape, & Film

UNIT : Introduction REFERENCES :

TIME : 1/2 hour TRAINING AIDS:

OBJECTIVES: UPON COMPLETION OF THIS COURSE THE TRAINEE WILL BE ABLE TO:

1. DEMONSTRATE AND DESCRIBE THE CORRECT AND SAFE PROCEDURES FOR FELLING AND BUCKING MATERIALS UNDER 8 INCHES DBH WITH A CHAIN SAW.

2. DEMONSTRATE AND DESCRIBE THE REQUIRED BASIC MAINTENCNCE TO KEEP A CHAIN SAW OPERATIONAL.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. COURSE TITLE	
	II. INSTRUCTOR INTRODUCTIONS	
	III. TRAINEE INTRODUCTIONS	
	IV. COURSE OBJECTIVES	
	V. COURSE AGENDA	
	VI. COURSE INTRODUCTION	STRESS THE IMPORTANCE OF SAFE CHAIN SAW OPERATING PROCEDURES. RECITE RECENT CHAIN SAW RE-LATED ACCIDENTS AND DEATHS.

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212A) TYPE : DEMONSTRATION AND DISCUSSION

UNIT : I CHAIN SAW COMPONENTS REFERENCES : CHAIN SAW MANUFACTURES MAINTENANCE MANUALS

TIME : 1 hour TRAINING AIDS: CHAIN SAW, FUEL MIXING OIL, EASEL PAPER

OBJECTIVES: LISTED UNDER II IN THE OUTLINE

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THIS LESSON IS TO ACQUAINT THE TRAINEE WITH THE CORRECT NOMENCLATURE OF THE CHAIN SAW SO THAT HE CAN IDENTIFY THE LOCATION AND FUNCTION OF EACH PART. THE UNIT MAY BE COVERED IN CONJUNCTION WITH UNIT II, FIELD MAINTENANCE. II. UNIT OBJECTIVES UPON COMPLETION OF THIS UNIT THE TRAINEE WILL BE ABLE TO: A. LIST 10 PARTS OF THE CHAIN SAW AND DESCRIBE THE FUNCTION OF EACH. B. IDENTIFY THE THREE BASIC TYPES OF SAW CHAINS. C. LIST THREE PARTS OF THE SAW CHAIN AND EXPLAIN THE FUNCTION OF EACH.	

TIME	OUTLINE	KEY POINTS AND AID CUES

D. LIST THE THREE MAIN PARTS OF THE CUTTER AND EXPLAIN THE FUNCTION OF EACH.

E. LIST THE TWO LUBRICATION SYSTEMS OF THE CHAIN SAW AND DESCRIBE EACH.

F. LIST TWO FILTRATION SYSTEMS AND GIVE THE LOCATION AND FUNCTION OF EACH.

III. CLASS ARRANGEMENT AND STRUCTURE

A. FOR SECTIONS IV-XII OF THIS UNIT, THE INSTRUCTOR SHOULD DISASSEMBLE, NAME, AND EXPLAIN THE FUNCTION OF EACH PART OF THE CHAIN SAW.

IV. THE CHAIN SAW

A CHAIN SAW IS A LIGHTWEIGHT, PORTABLE POWER TOOL USED FOR CUTTING WOOD. ITS APPLICATION HAS SAVED HOURS OF TIME AND CREW FATIGUE IN MANY WORK PROJECTS. ESSENTIALLY A CHAIN SAW IS COMPOSED OF TWO UNITS:, ONE BEING THE POWER PLANT, WHICH IS A TWO-CYCLE AIR COOLED ENGINE: THE OTHER IS THE CUTTING UNIT.

V. CUTTING ATTACHMENT

THE CUTTING ATTACHMENT CONSISTS OF A CLUTCH DRUM AND A SPROCKET THAT DRIVES THE NARROW STEEL CHAIN FITTED WITH VERY SHARP CUTTING TEETH, CALLED CUTTERS, AROUND A THIN STEEL GUIDE BAR (FIGURE 1).

Cutting Attachment

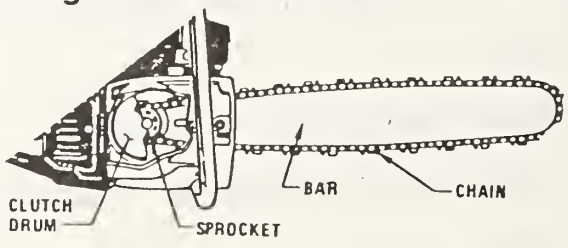


FIGURE 1

TIME	OUTLINE	KEY POINTS AND AID CUES

A. SAW CHAIN. SAW CHAIN IS MADE OF METAL PARTS RIVETED TOGETHER TO FORM A FLEXIBLE LOOP (FIGURE 2).

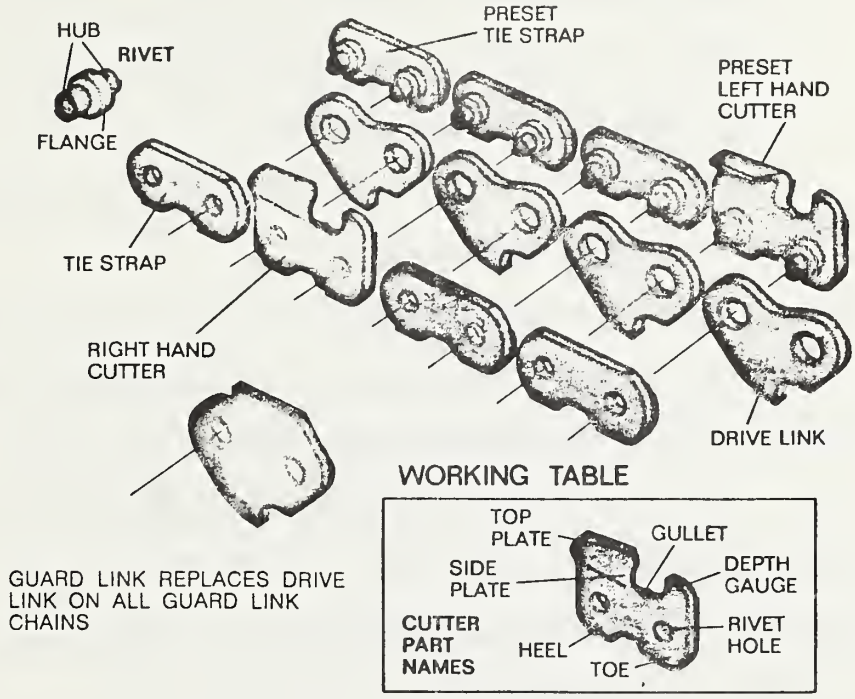


FIGURE 2

1. DRIVE LINK. THE CENTER LINK, OR DRIVE LINK, OF THE CHAIN HOOKS INTO THE SPROCKET SO THAT THE CHAIN CAN BE PROPELLED AROUND THE BAR.
2. CUTTERS. THE SAW CHAIN HAS BOTH LEFT-HAND AND RIGHT-HAND CUTTERS. CUTTERS HAVE A TOP PLATE THAT IS SHARPENED TO A FINE EDGE FOR CUTTING. THE SIDE PLATE CUTTER RELEASES THE WOOD ON THE SIDE WHILE THE TOP PLATE CHIPS WOOD OUT OF THE MIDDLE SIMILAR TO A CHISEL.
3. DEPTH GAUGE (RAKERS). THE DEPTH GAUGE DETERMINES HOW DEEP THE TOP PLATE PENETRATES INTO THE WOOD EACH TIME IT CUTS A "CHIP".

TIME	OUTLINE	KEY POINTS AND AID CUES
	THERE ARE THREE BASIC TYPES OF SAW CHAINS. CHIPPER CHAIN--ROUNDED SIDE PLATE AND TOP PLATE WITH ROUNDED APPEARANCE. SEMI-CHISEL CHAIN--SIDE PLATE AND TOP PLATE FLAT WITH THE CORNER BETWEEN THEM ROUNDED. CHISEL CHAIN--SIDE PLATE AND TOP PLATE FLAT WITH THE CORNER BETWEEN THEM SQUARE. THE CHIPPER CHAIN DOES NOT CUT AS FAST AS THE SEMI-CHISEL OR THE FULL CHISEL CHAIN BECAUSE IT MUST CUT THROUGH THE SAME WOOD FIBER SEVERAL TIMES AS IT PASSES THROUGH THE TREE. THIS MEANS MORE WORK FOR THE ENGINE, SLOWER CUTTING ACTION, AND SHORTER CHAIN LIFE. THE MAIN ADVANTAGE OF THE CHIPPER CHAIN IS THE QUICKNESS AND EASE OF MAINTENANCE. B. SPROCKET. THE SPROCKET RELAYS THE POWER FROM THE ENGINE TO PULL THE CHAIN AROUND THE BAR AND THROUGH THE WOOD. C. CLUTCH DRUM. THE CLUTCH DRUM IS CONNECTED SO THAT IT CAN SLIP OR DRIVE DEPENDING UPON THE POWER OR REVOLUTIONS OF THE ENGINE. ITS PRIMARY PURPOSE IS TO RELAY THE POWER OF THE ENGINE TO THE SPROCKET WHICH PULLS THE CHAIN AROUND THE BAR. D. BAR. THE BAR GUIDES THE CHAIN SO THAT A STRAIGHT CUT CAN BE ACCOMPLISHED. BARS COME IN LENGTH OF 10 TO 44 INCHES AND LARGER, DEPENDING ON THE INTENDED JOB AND ARE CONNECTED TO THE SAW BY TWO MOUNTING LUGS (FIGURE 3).	  

TIME	OUTLINE	KEY POINTS AND AID CUES

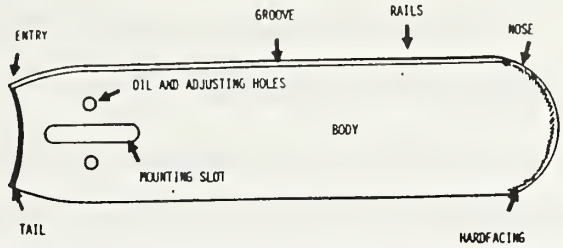


FIGURE 3

1. ENTRY. THE ENTRY IS DESIGNED TO ALLOW THE CHAIN TO ENTER THE BAR FROM THE SPROCKET.
2. OIL AND ADJUSTING HOLES. THE OIL HOLES ALLOW THE CHAIN OIL TO SEEP INTO THE GROOVE SO THAT THE CHAIN CAN BE LUBRICATED. (MORE WILL BE SAID ABOUT THIS LATER.) THE ADJUSTING HOLES ALLOW THE BAR TO BE MOVED FORWARD OR BACKWARDS SO THAT CORRECT CHAIN TENSION CAN BE SET.
3. GROOVE. THE GROOVE IS A SLOT IN THE BAR WHERE THE DRIVE LINKS RUN.
4. RAILS. THE RAILS SERVE AS A 90^{O} GUIDE TO KEEP THE SAW CHAIN RUNNING STRAIGHT. IF THE RAILS ARE SPLAYED OR UNEVEN, THE CHAIN RUNS TILTED, CAUSING CURVED CUTS.
5. NOSE. THE FRONT OF THE GUIDE BAR.
6. HARDFACING. IS A HARDENED SURFACE ON THE NOSE OF THE BAR TO REDUCE WEAR ON THE BAR FROM THE ROTATING CHAIN.
7. BODY. THE MAJOR PART OF THE GUIDE BAR.

TIME	OUTLINE	KEY POINTS AND AID CUES

8. MOUNTING SLOT. THIS SLOT HAS TWO FUNCTIONS.

   A. IT ALLOWS THE MOUNTING STUDS TO GO THROUGH THE BAR, TO FIX IT TO THE SAW.

   B. IT ALLOWS THE BAR TO ADJUST CHAIN TENSION.

9. TAIL. THE TAIL IS THE EXIT PART OF THE CHAIN AND ALLOWS THE DRIVE LINKS TO OMIT ANY DIRT PARTICLES THAT MAY HAVE ACCUMULATED IN THE GROOVE.

E. PLATES. THERE ARE TWO PLATES ON A CHAIN, THE INNER PLATE AND THE OUTER PLATE. THE PLATES ARE MADE FROM HIGH CARBON STEEL AND SERVE THREE FUNCTIONS (FIGURE 4).

1. THEY KEEP THE CHAIN FROM JUMPING OUT AND DAMAGING THE SAW.
2. THEY DIRECT THE OIL INTO THE CHAIN ASSEMBLY.
3. THEY HELP KEEP DIRT AND PARTICLES FROM ENTERING THE BAR.

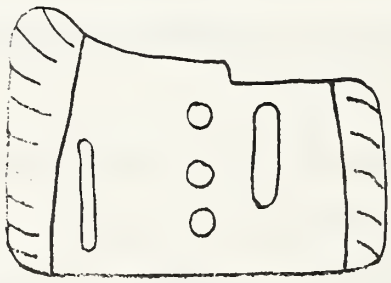


FIGURE 4

F. DRIVE CASE COVER. THIS COVER PROTECTS THE CLUTCH AND SPROCKET MECHANISM FROM ANY DAMAGE, HELPS TO KEEP THE OPERATOR FROM GETTING HIS HANDS CAUGHT OR CUT IN THE CHAIN, AND DIRECTS THE WOOD CHIPS OUT THE BOTTOM.

G. BAR ADJUSTING SCREW. THE BAR ADJUSTING SCREW FITS INTO THE ADJUSTING HOLE IN THE GUIDE BAR (FIG. 3) AND MOVES

TIME	OUTLINE	KEY POINTS AND AID CUES

THE BAR EITHER FORWARD OR BACKWARD SO THE CORRECT CHAIN TENSION CAN BE SET.

H. BUMPER SPIKE (DOGS). THE DOGS IS A SAWLIKE ATTACHMENT MOUNTED NEXT TO THE BAR SO THE OPERATOR CAN HOOK HIS SAW INTO THE LOG OR TREE FOR BETTER CONTROL WHILE CUTTING (FIGURE 5).

FIGURE 5

VI. LUBRICATION SYSTEM

THIS SYSTEM IS A MEANS OF MOVING A LUBRICANT TO ANY MOVING PART TO REDUCE FRICTION AND HEAT.

A. ENGINE LUBRICATION. TWO-CYCLE ENGINES NOT HAVING VALVE GEARS LEAVE ONLY THREE PARTS TO BE LUBRICATED. THEY ARE:

1. THE CRANK SHAFT BEARINGS.
2. THE CONNECTING ROD BEARINGS.
3. THE PISTON RINGS AND CYLINDER WALL.

OIL IS APPLIED TO THESE AREAS BY MIXING IT WITH REGULAR GRADE GASOLINE USING THE MANUFACTURE'S RECOMMENDED TWO-CYCLE OIL AND MIXING RATIO. IT IS THEN CONVERTED TO A MIST BY THE INDUCTION SYSTEM BEFORE GOING INTO THE COMBUSTION CHAMBER.

STRESS USING ONLY REGULAR GRADE GAS, NOT UNLEADED OR PREMIUM. SHOW EXAMPLES OF FUEL MIXING OIL.

B. CUTTING ATTACHMENT LUBRICATION. CHAIN LUBRICATION IS ACCOMPLISHED BY TWO METHODS, BOTH SUPPLIED BY THE SAME OIL RESERVOIR LOCATED UNDER THE ENGINE.

TIME	OUTLINE	KEY POINTS AND AID CUES
	1. AUTOMATIC CHAIN OILER. PROVIDES A CONTINUOUS FLOW OF LUBRICATING OIL TO THE BAR AND CHAIN DURING OPERATION. THE AMOUNT OF FLOW IS ADJUSTABLE ON MOST SAWS, BUT IS LEFT TO A MECHANIC.	RULE OF THUMB FOR AUTOMATIC CHAIN OILER: 1 TANK OIL/ 1 TANK GAS.
	2. MANUAL CHAIN OILER. PROVIDES LUBRICATION WHERE CUTTING OPERATIONS REQUIRE MORE OIL OR WHEN THE AUTOMATIC OILER MALFUNCTIONS. THE PUMP BUTTON IS LOCATED ON THE LEFT HAND SIDE OF THE HANDLE ON THE HOMELITE SAW AND PUMPS OIL THROUGH A COPPER LINE TO THE BAR AND CHAIN. ON OTHER SAW IT IS ALSO EASILY ACCESSIBLE FOR THE OPERATOR TO USE.	CAN BE LOCATED IN DIFFERENT LOCATION ON SOME SAWS AND NOT AT ALL ON OTHERS WITH SET AUTOMATIC OILERS.
	VII. FUEL SYSTEM THE FUEL SYSTEM ON A CHAIN SAW IS SEVERAL COMPONENTS WORKING IN UNISON TO MAKE THE SAW OPERABLE.	
	A. FUEL TANK. THE FUEL TANK IS NORMALLY LOCATED IN THE FRONT OF THE SAW WITH THE FILLER CAP RESTING ON TOP. ITS FUNCTION IS STORAGE FOR THE FUEL MIXTURE.	
	B. FUEL FILTER. THE FUEL FILTER IS LOCATED IN THE FUEL TANK. IT IS CONNECTED TO THE LINE THAT RUNS FROM THE FUEL TANK TO THE CARBURETOR. THIS FILTER IS A REPLACEABLE UNIT IN THE FIELD. IT FILTERS PARTICLES FROM THE FUEL SO THEY WILL NOT OBSTRUCT THE FUEL FLOW OR MIXTURE JETS ON THE CARBURETOR.	
	C. CARBURETOR. THE FUNCTION OF THE CARBURETOR IS TO MIX THE FUEL AND AIR IN A CORRECT RATIO. THE CARBURETOR IS CONNECTED TO THE ENGINE DIRECTLY OPPOSITE THE INTAKE PORTS.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	D. AIR FILTER. THE AIR FILTER IS LOCATED OVER THE CARBURETOR. IT FILTER FOREIGN MATERIALS FROM THE AIR.	
	E. IDLE SCREW. THE IDLE SCREW IS A MECHANICAL STOP FOR THE THROTTLE AND REGULATES HOW MUCH FUEL THE CARBURETOR OR ENGINE USES WHILE THE SAW IS IDLING.	
	F. THROTTLE LINKAGE. THE THROTTLE ON A SAW HAS THE SAME FUNCTION AS ON ANY GASOLINE OPERATED PIECE OF EQUIPMENT. IT CONTROLS THE QUANTITY OF FUEL THAT THE ENGINE BURNS. ON A CHAIN SAW THE THROTTLE BUTTON IS LOCATED IN THE HANDLE ON THE BACK OF THE SAW WITH A LINKAGE RUNNING TO THE CARBURETOR SHAFT.	SOME SAWS HAVE DOUBLE TRIGGER FOR SAFETY PURPOSES.
	G. THROTTLE LOCK BUTTON. THE THROTTLE LOCK BUTTON IS ON THE RIGHT HAND SIDE OF THE HANDLE AND LOCKS THE THROTTLE OPEN FOR EASE OF STARTING AT THE HIGH-SPEED SETTING.	
	H. CHOKE. THE CHOKE IS LOCATED ON THE RIGHT HAND SIDE OF THE HANDLE ON THE SAW AND IS USED ONLY FOR COLD STARTS. THE CHOKE IS CONNECTED TO THE CARBURETOR VIA A LINKAGE THAT RUNS THROUGH THE CARBURETOR HOUSING, AND IS NEEDED TO CUT DOWN THE AIR FLOW TO ENRICH THE FUEL MIXTURE.	LOCATION CAN VARY FROM SAW TO SAW ESPECIALLY FOREIGN SAWS.
	VIII. IGNITION SWITCH THE IGNITION SWITCH IS USED TO TURN THE SAW ON OR OFF. ALSO IT HAS THE DUAL PURPOSE OF BEING A SAFETY MECHANISM.	
	IX. STARTER ASSEMBLY THE STARTER CORD AND RETURN SPRING ARE LOCATED IN A HOUSING ON THE LEFT HAND SIDE OF A CHAIN SAW. THE FUNCTION OF THE STARTER ASSEMBLY IS TO START THE ENGINE BY ACTIVATING THE MAGNETO WHICH SENDS A CHARGE TO THE SPARK PLUG.	

TIME	OUTLINE	KEY POINTS AND AID CUES

X. SPARK PLUG

THE SPARK PLUG IS LOCATED IN THE HEAD ON TOP OF THE CYLINDER AND IS USED TO IGNITE THE FUEL AIR MIXTURE.

XI. MUFFLER

THE MUFFLER ON A CHAIN SAW SERVES THREE PURPOSES.

A. IT HAS A SPARK ARRESTER BUILT INTO IT.

B. THE SOUND SILENCER MUFFER PATENTED MY MCCULLOCH IS DESIGNED TO REDUCE HIGH-FREQUENCY NOISE IMPULSE BY 75 PERCENT AND OVERALL ENGINE NOISE BY 50 PERCENT, COMPARED TO STANDARD CAVITY-TYPE MUFFLERS.

C. IT CONTROLS THE AMOUNT OF RAW GASES EMITTED INTO THE ENVIRONMENT.

XII. COMPRESSION RELEASE

THE COMPRESSION RELEASE IS USED TO RELEASE THE ENGINE COMPRESSION TO AID IN EASE OF STARTING THE CHAIN SAW.

XIII. SUMMARY

A. QUESTIONS AND ANSWERS.

B. REVIEW UNIT OBJECTIVES.

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212A)

TYPE : DEMONSTRATION AND DISCUSSION

UNIT : II CHAIN SAW FIELD MAINTENANCE

REFERENCES : CHAIN SAW MANUFACTURERS MAINTENANCE MANUALS
OREGON SAW CHAIN MAINTENANCE MANUAL

TIME : 1/2 hour

TRAINING AIDS: CHAIN SAW, GREASE RAGS OR PAPER TOWELS, EASEL PAPER

OBJECTIVES: LISTED UNDER II IN THE OUTLINE

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THIS UNIT IS TO ACQUAINT THE TRAINEE WITH THE CORRECT PROCEDURES FOR FIELD MAINTENANCE OF THE COMMONLY USED CHAIN SAWS. THIS UNIT MAY BE COVERED IN CONJUNCTION WITH UNIT I, COMPONENTS.	

TIME	OUTLINE	KEY POINTS AND AID CUES

II. UNIT OBJECTIVES

UPON COMPLETION OF THIS UNIT THE TRAINEE WILL BE ABLE TO:

A. STATE THE BASIC FUEL-OIL MIXTURE FOR THE CHAIN SAW.

B. DESCRIBE THE PROCEDURES FOR CLEANING AN AIR FILTER.

C. DESCRIBE THE PROCEDURE IN REMOVING AND REPLACING THE BAR.

D. DESCRIBE THE CORRECT PROCEDURE FOR ADJUSTING THE TENSION OF THE CHAIN.

E. STATE THE RECOMMENDED FILING ANGLE FOR SHARPENING THE CUTTERS.

F. EXPLAIN THE PURPOSE OF DEPTH GAUGES AND HOW THEY ARE SET.

G. LIST 5 PARTS OF THE SAW THAT SHOULD BE INSPECTED OR MAINTAINED DAILY.

III. INTRODUCTION

A CHAIN SAW IS SIMILAR TO ANY OTHER PIECE OF MECHANICAL EQUIPMENT. PROPER USE AND MAINTENANCE OF BOTH THE SAW AND CHAIN GREATLY INCREASES THEIR USEFUL LIFE. A PROPERLY CARED FOR CHAIN SAW CUTS QUICKER, AND GIVES MANY MORE HOURS OF TROUBLE-FREE SERVICE. IN THIS UNIT YOU WILL BE EXPOSED TO EVERY DAILY AND PERIODIC MAINTENANCE AND SERVICING PROCEDURE THAT YOU WILL NEED TO KNOW TO PERFORM FIELD MAINTENANCE ON A CHAIN SAW. AS A CATCHALL FOR ALL MAINTENANCE IT'S NICE TO HAVE AN OWNER'S MANUAL AVAILABLE FOR THE MAKE AND MODEL OF THE SAW BEING USED. THE UNIT WILL BE ORGANIZED INTO THREE MAJOR SEGMENTS:

ENGINE OR POWER PLANT MAINTENANCE.

CUTTING COMPONENTS MAINTENANCE.

TIME	OUTLINE	KEY POINTS AND AID CUES
	DAILY AND PERIODIC MAINTENANCE.	
	IV. FUEL AND INDUCTION SYSTEM	
	THE GRADE OF GASOLINE IS VERY IMPORTANT IN MACHINERY. IN THE CHAIN SAW, UNCONTAMINATED REGULAR GRADE GASOLINE IS USED WHEN MIXED WITH A HIGH GRADE TWO-CYCLE OIL. DO NOT USE HIGH LEAD CONTENT (PREMIUM) OR UNLEADED GASOLINE IN ANY TWO-CYCLE ENGINE.	PREFERABLY 88 OCTAIN REGULAR GASOLINE
	A. MIXING FUEL. ALWAYS MIX THE GAS AND OIL IN A CLEAN SAFETY CAN THEN POUR THE MIXTURE INTO THE SAW TANK. FACTORY RECOMMENDATION ARE 16:1 GASOLINE TO OIL FOR THE HOMELITE AND MCCULLOCH RESPECTIVELY FOR THE STANDARDIZATION PURPOSES. IT IS BEST TO USE THE MAC OIL WITH A MCCULLOCH AND HOMELITE OIL WITH A HOMELITE, BUT SUBSTITUTIONS CAN BE MADE AS LONG AS IT'S A HIGH QUALITY TWO-CYCLE OIL AND THE CORRECT WEIGHT. MCCULLOCH AND HOMELITE DO MAKE A CONCENTRATED OIL AND SHOULD BE USED IF IT IS AVAILABLE. NEVER TRY TO MIX GASOLINE AND OIL IN THE SAW TANK OR USE A MULTI-VISCOSITY DETERGENT MOTOR OIL INTENDED FOR FOUR-CYCLE ENGINES.	
	ALSO CHECK TO SEE THAT YOUR SAW GAS AND OIL CONTAINERS ARE IN GOOD CONDITION AND THAT YOU HAVE A SUFFICIENT SUPPLY.	
	CAUTION!! NEVER REMOVE THE FUEL CAP WHEN THE TANK IS FULL AND THE ENGINE IS HOT, BECAUSE THE FUEL IS UNDER PRESSURE DUE TO EXPANSION. ALWAYS LOOSEN THE CAP ONE-HALF TURN AND LET THE PRESSURE BLEED OFF BEFORE REMOVAL TO PREVENT SPILLAGE.	

TIME	OUTLINE	KEY POINTS AND AID CUES

B. AIR FILTER. THE AIR FILTER SHOULD BE CLEANED DAILY OR SOONER DEPENDING ON CONDITIONS. TO CLEAN THE AIR FILTER FIRST CLOSE THE CARBURETOR CHOKE TO PREVENT PARTICLES FROM ENTERING THE CYLINDER THEN REMOVE THE CARBURETOR HOUSING COVER AND BLOW OR SHAKE OFF THE LOOSE CHIPS AND PARTICLES. THEN REMOVE THE FILTER AND WASH IT IN A CLEAN SOLVENT, STRAIGHT GASOLINE, OR DETERGENT. DO NOT USE MIXED GAS BECAUSE IT LEAVES AN OIL FILM THAT COLLECTS DIRT. IN EXTREME CONDITIONS YOU MAY USE MIXED GAS BUT GENERALLY THIS IS NOT A GOOD PRACTICE. AFTER CLEANING THE FILTER, BLOW IT DRY, BUT NOT WITH A HOT EXHAUST AND THEN REPLACE. BEFORE REPLACING THE CLEAN FILTER REMOVE ANY SAWDUST OR DIRT THAT MY HAVE COLLECTED IN THE CARBURETOR HOUSING.

WHEN THE FILTER IS REPLACED MAKE SURE THE EDGES SEAL PROPERLY AND THE COVER IS ON STRAIGHT SO THAT IT DOES NOT BREAK WHEN IT'S FASTENED DOWN.

CAUTION!! NEVER OPERATE A CHAIN SAW WITHOUT AN AIR FILTER.

V. IGNITION MAINTENANCE

FAILURE OF THE ENGINE TO START MAY BE DUE TO A WET, FOULED, OR OTHERWISE FAULTY SPARK PLUG. STEPS FOR CHANGING AND CHECKING THE PLUG ARE AS FOLLOWS.

A. STEPS FOR CHANGING SPARK PLUGS.

1. PULL OFF RUBBER BOOT AND REMOVE SPARK PLUG.
2. CHECK THE PLUG.
   A. A WET PLUG INDICATES A FLOODED ENGINE DUE TO FAULTY FUEL OR SPARK PLUG BREAKDOWN.

TIME	OUTLINE	KEY POINTS AND AID CUES
	B. AN OILY PLUG INDICATES A DIRTY AIR FILTER, TOO MUCH OIL IN THE GAS, OR A TOO-RICH MIXTURE ON CARBURETOR JET.	
	3. THE PLUG, IF FIRING ALL RIGHT, SHOULD BE CLEANED AND THE GAP ADJUSTED TO .025. IN THE FIELD, A ROUGH .025 SETTING IS APPROXIMATELY A FOLDED MATCH BOOK COVER.	
	4. CHECK FOR SPARK OR FIRING.	
	A. INSERT PLUG INTO PLUG WIRE.	
	B. GROUND THE PLUG TO THE SIDE OF THE ENGINE.	
	C. PULL STARTER CORD AND LOOK FOR THE SPARK JUMPING THE GAP.	
	D. IF THERE IS NOT A DISTINCT SHARP SPARK, THEN THE PLUG MAY BE FAULTY OR THE MAGNETO MAY BE FAULTY.	
	VI. LUBRICATION COMPONENTS	
	A. WITHOUT PROPER LUBRICATION ANY PIECE OF EQUIPMENT WITH MOVING PARTS WILL BURN UP.	
	1. ENGINE LUBRICATION. THE ENGINE RECEIVES ITS LUBRICATION FROM THE OIL IN THE FUEL MIXTURE.	
	2. BAR AND CHAIN LUBRICATION. IF THE CHAIN BECOMES DRY AND THE BAR HOT, IT IS A GOOD INDICATION OF ONE OR A COMBINATION OF THREE THINGS. ONE IS THAT THE OIL RESERVOIR IS EMPTY, TWO THAT THE AUTOMATIC OR MANUAL OILER PUMP IS FAULTY, AND THREE, THAT THE OIL SLOT IS PLUGGED BY DUFF, DIRT AND WOOD CHIPS.	CAUTION! ALWAYS CHECK OIL PUMP BEFORE USING THE SAW.
	A. FIRST, FILL THE BAR OIL RESERVOIR. ON SAWS WITH AUTOMATIC OILERS, IF THE OILER IS PROPERLY ADJUSTED, THERE SHOULD BE A SMALL AMOUNT OF OIL	

TIME	OUTLINE	KEY POINTS AND AID CUES
	LEFT IN THE OIL RESERVOIR. IF IT IS DRY, YOUR CHAIN MAY BE RUNNING TOO HOT FROM IMPROPER LUBRICATION. B. BEFORE RUNNING OUT OF GAS ON YOUR NEXT TANK, REFILL THE BAR OIL RESERVOIR. THIS ENSURES PROPER OILING. IF YOU HAVE A LARGE AMOUNT OF OIL LEFT IN THE RESERVOIR, YOUR OILING SLOTS MAY BE PLUGGED OR YOUR OILER IS ADJUSTED TOO LEAN. C. TO CHECK WHETHER THE ADJUSTMENT IS TOO LEAN, DEPRESS THE MANUAL OILER BUTTON TWO OR THREE TIMES. IF IT WORKS PROPERLY, AND OIL APPEARS ON TOP OF THE BAR NEAR THE ENGINE, YOU WILL HAVE TO SUPPLEMENT THE AUTOMATIC OILER WITH AN OCCASIONAL EXTRA SQUIRT OF OIL. D. IF YOU ARE UNABLE TO GET ANY OIL BY USING THE MANUAL OILER, REMOVE THE BAR AND CHAIN AND CLEAN THE OILING GROOVES IN THE BAR. AN INADEQUATE SUPPLY OF OIL TO THE CHAIN CAN GREATLY REDUCE BOTH THE EFFICIENCY OF YOUR CUTTING AND THE LIFE OF YOUR CHAIN, BAR, AND SPROCKET. CHECK YOUR OILER OFTEN WHILE USING THE SAW. E. IF COLD AND SNOWY CONDITIONS ARE ENCOUNTERED, USE OF A SPECIAL BAR AND CHAIN OIL MAY BE NECESSARY INSTEAD OF THE GOOD QUALITY SAE 20 OR 30 MOTOR OIL. THIS OIL IS FORMULATED TO FLOW FREELY IN COLD WEATHER AND YET CLING TO THE BAR AND CHAIN INSTEAD OF BEING THROWN OFF OR WASHED AWAY BY SNOW.	

TIME	OUTLINE	KEY POINTS AND AID CUES

3. IF OIL PUMP MAINTENANCE IS REQUIRED, THE ONLY THING TO DO IS SEND THE CHAIN SAW BACK TO THE SHOP TO A QUALIFIED MECHANIC.

A. MOST SAWS IN THE GOVERNMENT WILL BE DIRECT DRIVE, BUT ON OCCASION YOU WILL RUN ACROSS A GEAR DRIVEN SAW. IF YOU DO, ALWAYS CHECK THE OIL LEVEL IN THE GEAR BOX.

1. HAVE THE SAW SITTING LEVEL AND REMOVE THE PLUG.

2. THE OIL LEVEL SHOULD REACH TO THE BOTTOM OF THE PLUG HOLE OR JUST RUN OUT.

3. IF LOW, ADD 90- OR 140-WT. GEAR OIL WHICHEVER IS RECOMMENDED.

4. REPLACE THE PLUG.

VII. GUIDE BAR MAINTENANCE

AFTER EXTENDED USE, THE GUIDE BAR AND THE OIL SLOTS CAN BECOME CLOGGED WITH DIRT AND WOOD CHIPS. TO CLEAN THE BAR REMOVE IT FROM THE SAW AFTER REMOVING THE CHAIN AND SCRAPE THE INSIDE CLEAN WITH A SMALL NAIL OR POCKET KNIFE OR ANY OTHER HANDY GADGET. AFTER APPROXIMATELY 40 HOURS OF USE, REVERSE THE BAR SO THAT THE ENTRY AND EXIT CHANGE ROLES. IF THE BAR HAS A SPROCKET OR ROLLER TIP LUBRICATE IT WITH A HIGH QUALITY GREASE EACH TIME YOU FUEL THE SAW.

TO REMOVE GUIDE BAR:

A. LOOSEN BAR NUTS.

B. ROTATE ADJUSTING SCREW TO LOOSEN CHAIN.

C. REMOVE BAR NUTS.

TIME	OUTLINE	KEY POINTS AND AID CUES
	D. REMOVE DRIVE CASE COVER.	
	E. REMOVE OUTER PLATE.	
	F. REMOVE GUIDE BAR.	
	VIII. CHAIN MAINTENANCE	
	PROPER CARE GIVEN TO THE CHAIN IS ONE OF THE MOST DEMANDING AND TIME CONSUMING ITEMS FOR THE OPERATOR. UNLESS THE CHAIN IS TAKEN CARE OF PROPERLY THE OPERATOR MAY AS WELL NOT HAVE THE SAW. LISTED ARE SOME OF THE STEPS FOR GOOD CHAIN CARE.	
	A. CHAIN TENSION. THE TENSION OF THE CHAIN SHOULD BE KEPT ADJUSTED TO PREVENT EXCESSIVE WEAR.	
	1. HOLD UP TIP OF BAR DURING TENSION ADJUSTMENT AND UNTIL BAR NUTS HAVE BEEN SNUGGED. THIS PREVENTS SHIFT OF THE BAR ON ITS MOUNT.	CAUTION: IT'S BEST TO WEAR GLOVES.
	2. TURN ADJUSTING SCREW TO TAKE UP THE SLACK UNTIL CHAIN IS FULLY TIGHT, THEN BACK OFF THE TIGHTENER SCREW 1/8 TURN THEN TIGHTEN THE BAR NUTS AND SQUIRT THE CHAIN OILER THREE TIMES. YOU SHOULD THEN BE ABLE TO PULL THE CHAIN THROUGH BY HAND.	
	CAUTION!! CHECK CHAIN TENSION ON A NEW CHAIN EVERY FEW CUTS DURING THE FIRST HALF HOUR OF OPERATION. THE CHAIN TENDS TO STRETCH AND NEEDS ADJUSTMENT.	
	3. THE CHAIN SHOULD NEVER EXTEND BELOW THE BAR. THE TENSION OF THE CHAIN ON A ROLLER TIP OR SPROCKET TIP BAR SHOULD BE TIGHTER THAN ON A CONVENTIONAL TIP.	
	B. SHARPENING THE CHAIN. THE CHAIN SHOULD BE KEPT SHARP TO INCREASE THE CUTTING LOAD AND MINIMIZE CHAIN WEAR.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	1. DIMENSIONS AND ANGLES VARY FOR VARIOUS BRANDS AND TYPES OF CHAINS BUT GENERALLY THE CUTTERS ARE FILED IN THIS MANNER. LOOKING FROM THE TOP, THE CUTTER SHOULD BE ANGLED BACK AT AN ANGLE OF 30 DEGREES FOR CHISEL CHAIN AND 35 DEGREES FOR SEMI-CHISEL CHAIN AND CHIPPER CHAIN.	
	2. THERE ARE SEVERAL TYPES OF INEXPENSIVE FILE HOLDERS THAT ARE MARKED WITH THE PROPER FILING ANGLE AND ALSO CONTROL THE DEPTH OF THE FILE IN THE GULLET OF THE CUTTER.	
	3. HOLD THE BAR SO IT WILL NOT MOVE WHEN THE FILING STROKE IS MADE. FILE ALL OF THE CUTTERS ON ONE SIDE OF THE CHAIN FIRST. THIS HELPS TO HOLD THE PROPER ANGLE. WITH A NORMAL FILING TWO OR THREE LIGHT STROKES WILL BE ADEQUATE. EACH CUTTER SHOULD BE FILED THE SAME AMOUNT SO THEY WILL ALL REMAIN NEARLY THE SAME LENGTH. THIS IS ONE OF THE MOST DIFFICULT PARTS OF CHAIN FILING AS MOST PEOPLE FIND IT EASIER TO FILE IN ONE DIRECTION AND END UP WITH THE CUTTERS LONGER ON ONE SIDE OF THE CHAIN. IF ONE OR MORE OF THE CUTTERS HAVE RECEIVED DAMAGE THAT MUST BE FILED OUT THEN ALL OF THE CUTTERS MUST BE FILED BACK THE SAME AMOUNT.	SHARPEN FROM THE INSIDE TOWARD THE OUTSIDE OF THE CUTTER.
	4. THERE ARE OTHER, MORE SOPHISTICATED FILING GUIDES AVAILABLE THAT TAKE ALL OF THE GUESSWORK OUT OF CHAIN SHARPENING. THE FILING ANGLES CAN BE SET PRECISELY TO THE MANUFACTURER'S RECOMMENDATIONS AND	

TIME	OUTLINE	KEY POINTS AND AID CUES
	EACH CUTTER WILL BE FILED TO THE SAME LENGTH. IT IS A GOOD PRACTICE FOR EVEN AN EXPERIENCED SAW FILER TO USE THIS TYPE OF AID OCCASIONALLY TO ASSURE THE CUTTERS ARE ALL EVEN.	
	5. STEPS FOR SHARPENING ARE:	
	A. HOLD THE FILE HOLDER FLUSH AGAINST THE TOP PLATE ON THE TOOTH SO THE FILE IS PARALLEL TO THE TOP PLATE, FILE FROM THE INSIDE OUT.	10^{o} ANGLE FOR CHISEL CHAIN
	B. USE LIGHT, BUT FIRM, PRESSURE ON THE FILE. THE FILE HOLDER WILL KEEP 10% OF THE FILE DIAMETER ABOVE THE TOOTH TO ALLEVIATE ANY HOOK IN THE TOOTH.	
	C. KEEP THE FILE LEVEL. LINE UP THE GUIDE MARK ON THE HOLDER WITH THE CENTER LINE OF THE CHAIN.	10^{o} ANGLE FOR CHISEL CHAIN
	D. FILE TEETH WITH A FEW FIRM STROKES. DO NOT LET THE FILE DIP OR ROCK.	OCCASIONALLY ROTATE FILE IN FILE HOLDER.
	<u>CAUTION!!</u> ALWAYS MATCH THE CORRECT SIZE FILE WITH THE CHAIN ON THE SAW. DO NOT DRAG THE FILE BACK ACROSS THE CUTTER.	
	E. TO HELP KEEP THE SAW CHAIN SHARP ALWAYS USE A SCABBARD WHEN TRANSPORTING THE SAW AND NEVER WITH OTHER LOOSE TOOLS.	
	F. THE NEXT STEP TO AID IN KEEPING THE CHAIN SHARP IS TO CHECK OVER THE AREA WHERE THE CUT IS TO BE MADE AND CLEAN AWAY ANY DIRT, GRAVEL OR FOREIGN MATERIAL. THE BAR TIP MUST NOT TOUCH THE GROUND AS THE CUT IS MADE.	

TIME	OUTLINE	KEY POINTS AND AID CUES

C. SETTING THE DEPTH GAUGE CLEARANCE. EVERY THIRD OR FOURTH TIME THE CUTTERS ARE SHARPENED, THE DEPTH GAUGES, CALLED "RAKERS" SHOULD BE FILED.

1. ATTACH DEPTH GAUGE JIG ON THE CHAIN AND USE A FLAT FILE TO KNOCK OFF THE TIPS.

2. AFTER FILING, ROUND OFF THE SHARP SQUARE CORNER ABOUT ONE-THIRD TO FACILITATE SMOOTH ENTRY INTO THE CUT. CAUTION!! PROPER SETTING OF THE DEPTH GAGES IS VERY IMPORTANT TO ACHIEVING THE CUTTING CAPABILITIES DESIGNED INTO A SAW CHAIN. THE DEPTH GAGE CONTROLS THE BITE THE CUTTER TAKES AND MUST BE SET ACCURATELY TO MAINTAIN THE SELF-FEEDING CHARACTERISTICS OF THE CHAIN. IF THE DEPTH GAGES ARE TOO HIGH, THE CHAIN CUTS SLOWLY AND SAWYER APPLIES MORE PRESSURE. THE PRESSURE INCREASES FRICTION WHICH WEARS THE CHAIN TIE STRAPS AND BAR. WHEN THE DEPTH GAGES ARE TOO LOW, THE CUTTER GOUGES INTO THE WOOD AND POUNDS THE HEEL OF THE CUTTER. THE DEPTH SETTING IS USUALLY .025 TO .035 FOR MOST CUTTING.

IX. PREVENTIVE MAINTENANCE

THE MOST IMPORTANT ASPECT OF KEEPING ANY PIECE OF EQUIPMENT OPERATING PROPERLY IS THE TIME TAKEN TO LOOK FOR FAULTS BEFORE THEY HAPPEN. ALWAYS TAKE THE TIME TO CLEAN THE SAW AFTER USING IT AND AT THE SAME TIME LOOK FOR THAT LOOSE SCREW OR BOLT THAT MIGHT LATER CAUSE A PROBLEM. USE PROPER TOOLS TO TIGHTEN--BUT DO NOT OVERTIGHTEN OR THREADS CAN BE DAMAGED AND THE CASING CRACKED OR BROKEN. IF YOU TREAT A CHAIN SAW

TIME	OUTLINE	KEY POINTS AND AID CUES

PROPERLY IT WILL GIVE YOU MANY HOURS OF TROUBLE-FREE SERVICE.

A. DAILY INSPECTION.

1. CHAIN SHOULD BE INSPECTED FOR CORRECT TENSION, SHARPNESS, AND PROPER DEPTH GAUGE SETTINGS.
2. INSPECT BAR FOR CRACKS, WORN SPOTS, BURRS, AND STRAIGHTNESS: CLEAN IF NECESSARY.
3. CHECK AIR FILTER TO SEE IF IT IS CLEAN AND CORRECTLY INSTALLED.
4. EXAMINE AND CLEAN EXTERIOR OF SAW.
5. CHECK FOR TIGHT MUFFLER BOLTS AND TO SEE IF MUFFLER IS IN GOOD WORKING ORDER.
6. CHECK RECOIL STARTER AND ROPE FOR PROPER TENSION AND WEAR.
7. CHECK GEAR CASE OIL LEVEL ON GEAR DRIVEN SAWS.
8. CHECK CHAIN OILER FOR PROPER OIL DISPERSEMENT: FULL OIL RESERVOIR.
9. TIGHTEN ALL NUTS, BOLTS, AND SCREWS.
10. CLEAN COOLING FINS AND FAN HOUSING.

X. SUMMARY

A. QUESTIONS AND ANSWERS.

B. REVIEW UNIT OBJECTIVES.

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212A)

TYPE : LECTURE, DEMONSTRATION, & DISCUSSION

UNIT : III BASIC CHAIN SAW OPERATIONS

REFERENCES : DOUGLAS DENT FILMS
PROFESSIONAL TIMBER FALLING
FALLERS AND BUCKERS HANDBOOK
HEALTH & SAFETY CODE, FSH 6109.13

TIME : 1/2 HOUR

TRAINING AIDS: EASEL PAPER

OBJECTIVES: UPON COMPLETION OF THIS UNIT, THE TRAINEE WILL BE ABLE TO:

1. LIST FIVE SAFETY ITEMS THAT THE OPERATOR SHOULD WEAR FOR ANY FIELD CHAIN SAW OPERATION.
2. DESCRIBE SAFE PROCEDURES FOR FUELING THE CHAIN SAW.
3. DESCRIBE THE PROPER PROCEDURE FOR STARTING A CHAIN SAW.
4. DESCRIBE SAFE STANCE AND HANDLING OF A CHAIN SAW.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. UNIT OBJECTIVES	
	II. SAFETY EQUIPMENT	
	A. CHAPS	
	B. HARD HAT	
	C. GLOVES	
	D. LONG SLEEVED SHIRT	
	E. LOOSE FITTING PANTS, NO CUFFS	
	F. NON SKID BOOTS	
	G. PROTECTIVE EYE GLASSES	
	H. EAR PLUGS	
	III. FUELING THE CHAIN SAW	

TIME	OUTLINE	KEY POINTS AND AID CUES
	A. SHUT OFF THE SAW IF IT IS HOT AND ALLOW IT TO COOL APPROXIMATELY 5 MINUTES PRIOR TO REFILLING.	
	B. PLACE THE SAW WITH THE BAR POINTING DOWNHILL ON BARE GROUND, FREE FROM GRASS, TWIGS AND OTHER FLAMMABLE OBJECTS.	
	C. USE A FUNNEL OR FLEXIBLE HOSE AND APPROVED SAFETY CAN WITH SPOUT TO AVOID SPILLAGE. DO NOT FILL THE TANK FULL TO THE BRIM.	
	D. CLEAN ANY SPILLED OIL OR GAS FROM THE SAW BEFORE STARTING THE ENGINE.	
	E. DO NOT START THE ENGINE AT THE PLACE OF REFUELING, MOVE AT LEAST 10 FEET AWAY.	
	F. DO NOT WAIT FOR THE ENGINE TO RUN OUT OF GAS BEFORE REFUELING. REMOVAL OF THE SAW FROM SOME CUTS MAY BE DIFFICULT AND DANGEROUS, AND FILLING A TILTED SAW MAY CAUSE SPILLAGE.	
	G. CHECK THE FUEL LINES AND CONNECTIONS FOR LEAKS.	
	H. KEEP A FIRE EXTINGUISHED NEARBY WHEN FUELING AND OPERATING THE SAW.	
	IV. STARTING THE CHAIN SAW	
	A. BE SURE YOU HAVE FIRM FOOTING AND BALANCE WHEN STARTING THE SAW.	
	B. PLACE THE SAW ON THE GROUND OR OTHER FIRM SURFACE. MAKE SURE THE BAR AND CHAIN DO NOT REST ON OR TOUCH ANYTHING. IF PLACED ON A LOG OR STUMP, LOWER THE DOGS INTO THE WOOD FOR BETTER STABILITY AND CONTROL.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	C. TURN ON THE IGNITION SWITCH.	
	D. PULL THE CHOKE WHEN STARTING A COLD SAW.	
	E. PUSH IN THE COMPRESSION RELEASE.	
	F. GRASP THE SAW FIRMLY.	
	G. PULL THE STARTER CORD OUT SLOWLY UNTIL THE STARTER COGS ENGAGE THEN PULL QUICKLY AND EVENLY ON THE STARTER CORD. PULL THE STARTER ROPE IN SHORT PULLS SO YOU DO NOT PULL THE ROPE ALL THE WAY OUT.	
	H. AFTER THE SAW STARTS, GUIDE THE STARTER CORD BACK INTO THE REEL. DO NOT LET IT SNAP BACK OR THE STARTER ASSEMBLY MAY BE DAMAGED.	
	I. PUSH IN THE CHOKE. THIS MAY NEED TO BE DONE EARLIER TO PREVENT THE SAW FROM FLOODING.	
	J. DO NOT GUN THE ENGINE TO HIGH SPEEDS DURING WARMUP. THIS IS ALSO A GOOD TIME TO PUMP A LITTLE OIL ON THE CHAIN AND CHECK THE MANUAL AND AUTOMATIC OILER TO INSURE THEY ARE WORKING PROPERLY.	
	V. SAFE STANCE AND HANDLING	DEMONSTRATE
	VI. SUMMARY	
	A. QUESTIONS AND ANSWERS.	
	B. REVIEW UNIT OBJECTIVES.	

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212A)
TYPE : LECTURE DEMONSTRATION AND DISCUSSION

UNIT : IV CHAIN SAW FIELD PRACTICES
REFERENCES : PROFESSIONAL TIMBER FALLING FALLERS AND BUCKERS HANDBOOK HEALTH AND SAFETY CODE, FSH 6109.13

TIME : 1 HOUR
TRAINING AIDS: CHAIN SAW WITH ACCESSORIES, BOW-BAR, GREASE RAGS

OBJECTIVES: LISTED UNDER II IN THE OUTLINE

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THIS UNIT IS TO ACQUAINT THE TRAINEE WITH THE SAFETY PRACTICES AND CORRECT METHODS FOR LIMBING, BUCKING AND FELLING A TREE OR SMAG. II. UNIT OBJECTIVES UPON COMPLETION OF THIS UNIT YOU WILL BE ABLE TO: A. LIST THREE SAFETY PRACTICES TO BE USED IN LIMBING A DOWNED TREE. B. DESCRIBE THE SAFE PROCEDURE FOR LIMBING A STANDING TREE. C. ILLUSTRATE THE PROPER CUTS FOR BUCKING LOGS THAT ARE UNDER TENSION AND COMPRESSION.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	D. LIST FIVE SAFETY PRACTICES TO FOLLOW WHEN BUCKING A DOWNED TREE OR SNAG.	
	E. LIST 5 ITEMS THE OPERATOR MUST SIZEUP BEFORE FELLING A TREE OR SNAG.	
	F. ILLUSTRATE THE PLACEMENT, SIZE, AND ANGLE OF THE UNDERCUT.	
	G. LIST TWO REASONS FOR USING AN UNDERCUT.	
	H. ILLUSTRATE THE PLACEMENT, ANGLE, AND DEPTH OF THE BACKCUT.	
	I. DESCRIBE THE HINGE AND HOW IT IS USED TO CONTROL THE FALL OF A TREE OR SNAG.	
	J. LIST TWO REASONS FOR USING A WEDGE WHEN FELLING A TREE OR SNAG.	
	K. DESCRIBE THREE SITUATIONS THAT COULD RESULT IN CHAIN SAW KICKBACK.	
	III. LIMBING	
	A. DEMONSTRATE PROPER LIMBING TECHNIQUES FOR A STANDING AND A DOWN TREE.	REFER TO THE FIELD EXAMINATION CHECK SHEET ON LIMBING IN WW-212B
	B. DISCUSS ANY QUESTIONS RAISED BY THE TRAINEES ON LIMBING.	
	IV. BUCKING	
	A. DEMONSTRATE PROPER BUCKING TECHNIQUES.	REFER TO THE FIELD EXAMINATION CHECK SHEET ON BUCKING IN WW-212B
	B. DISCUSS ANY QUESTIONS RAISED BY THE TRAINEES ON BUCKING.	
	V. FELLING	
	A. DEMONSTRATE PROPER FELLING TECHNIQUES.	REFER TO THE FIELD EXAMINATION CHECK SHEET ON FELLING IN WW-212B
	B. DISCUSS THE DIFFERENCE BETWEEN A CONVENTIONAL UNDERCUT AND A HUMBOLT UNDERCUT. EXPLAIN THE ADVANTAGES AND DISADVANTAGES OF EACH.	
	1. CONVENTIONAL UNDERCUT.	
	A. ALLOWS THE FALLER TO UTILIZE MORE OF THE TREE	

TIME	OUTLINE	KEY POINTS AND AID CUES
	THAN THE HUMBOLDT UNDERCUT. B. MINIMIZES BREAKAGE WHEN FALLING BECAUSE LOWER STUMPS ARE LEFT. 2. HUMBOLDT UNDERCUT. A. MAY SERVE AS AN ANTI-KICKBACK SAFETY VALVE. B. MINIMIZES BREAKAGE ON UNEVEN TERRAIN. C. DISCUSS ANY QUESTIONS RAISED BY THE TRAINEES ON FELLING. VI. KICKBACKS A. DISCUSS CAUSES OF KICKBACKS. 1. LOOSE CHAIN. 2. REINSERTION OF A MOVING CHAIN INTO A PREVIOUSLY BEGUN CUT. 3. WHEN THE BAR NOSE COMES INTO CONTACT WITH AN OBJECT SUCH AS ANOTHER LOG OR LIMB. VII. BOW-BARS A. DEMONSTRATE THE PROPER USE OF A BOW-BAR. B. DISCUSS ANY QUESTIONS RAISED BY THE TRAINEES ON THE USE OF A BOW-BAR. VIII. SUMMARY A. QUESTIONS AND ANSWERS. B. REVIEW UNIT OBJECTIVES.	 

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212A) TYPE : PRACTICAL EXERCISE

UNIT : V MAINTENANCE PRACTICAL APPLICATION REFERENCES : CHAIN SAW MANUFACTURER'S MAINTENANCE MANUALS

TIME : 1/2 HOUR TRAINING AIDS: CHAIN SAW WITH ACCESSORIES, GREASE RAGS

OBJECTIVES: UPON COMPLETION OF THIS UNIT THE TRAINEE WILL BE ABLE TO PERFORM REQUIRED FIELD MAINTENANCE ON A CHAIN SAW TO MAKE IT OPERATIONAL.

TIME	OUTLINE	KEY POINTS AND AID CUES
	GIVEN A CHAIN SAW EACH GROUP IS TO PERFORM THE NECESSARY MAINTENANCE ON THE SAW TO MAKE IT OPERATIONAL. THIS SAW SHOULD BE THE SAME ONE THE GROUP USES DURING THE FIELD EXERCISES. SUGGESTED MAINTENANCE FOR TRAINEES TO PERFORM. (INSTRUCTOR MAY WANT TO FIX THE CHAIN SAWS SO ONE OR MORE OF THE FOLLOWING ITEMS REQUIRE MAINTENANCE BEFORE THE CHAIN SAW IS OPERATIONAL.) 1. ADJUST TENSION OF THE CHAIN. 2. SHARPEN CHAIN. 3. CLEAN AIR FILTER. 4. GREASE-IF REQUIRED. 5. CHECK SPARK PLUG FOR PROPER GAP AND FOR FIRING. 6. CHECK OILER. 7. CHECK ALL NUTS, BOLTS, AND SCREWS.	

LESSON PLAN

COURSE :CHAIN SAW TRAINING (WW-212A) TYPE : EXAMINATIONS

UNIT :EXAMINATIONS REFERENCES : WW-212A COURSE

TIME :VARIABLE WITH EACH TRAINEE TRAINING AIDS: FIRST-AID KIT, CHAIN SAWS WITH ACCESSORIES, FIELD EXAMINATION CHECK LISTS, FIELD EXAMINATION SCORE SHEETS, WRITTEN EXAMINATIONS

OBJECTIVES:

UPON COMPLETION OF THIS UNIT THE TRAINEE WILL QUALIFY AS AN INEXPERIENCED OPERATOR QUALIFIED TO FELL AND BUCK MATERIALS UNDER 8 INCHES DBH.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THE FIELD AND WRITTEN EXAMINATIONS ARE TO INSURE THAT EACH TRAINEE HAS MET THE COURSE OBJECTIVES WHICH QUALIFIES THE TRAINEE TO FELL AND BUCK MATERIALS UNDER 8 INCHES DBH. II. FIELD EXAMINATION FOR THE FIELD EXAMINATION THE INSTRUCTORS WILL USE THE FIELD EXAMINATION CHECK SHEETS TO INSURE THE PASSING CRITERIA IS MET AND RECORD PERFORMANCE ON THE FIELD EXAMINATION SCORE SHEETS. THE NUMBER OF TREES EACH TRAINEE WILL BE REQUIRED TO LIMB BUCK AND FELL WILL BE DETERMINED BY THE INSTRUCTOR.	FIELD EXAMINATION CHECK SHEETS AND FIELD EXAMINATION SCORE SHEETS IN WW-212B

TIME	OUTLINE	KEY POINTS AND AID CUES
	INSTRUCTORS SHOULD MEET AND DISCUSS THE FIELD EXAMINATIONS TO INSURE CONTINUITY AMONG GRADING PROCEDURE.	
	III. WRITTEN EXAMINATION	
	A. A TRAINEE MUST PASS THE WRITTEN EXAM WITH A SCORE OF AT LEAST 70% CORRECT.	

TEST

SCORE_____ NAME_____

CHAIN SAW TRAINING (WW-212A)

FINAL TEST

1. LIST TEN PARTS OF THE CHAIN SAW AND DESCRIBE THE FUNCTION OF EACH. (10 PTS)

   1.

   2.

   3.

   4.

   5.

   6.

   7.

   8.

   9.

   10.

2. DESCRIBE THE PROCEDURE FOR CLEANING AN AIR FILTER. (4 PTS)

3. WHAT IS THE BASIC FUEL-OIL MIXTURE FOR THE CHAIN SAW WHEN USING AN UNCONCENTRATED TWO-CYCLE MOTOR OIL? (3 PTS)

4. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)

   1. CHISEL CHAIN

   2. CHIPPER CHAIN

5. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)

6. WHAT IS THE PURPOSE OF THE DEPTH GAUGES (RAKERS) AND HOW ARE THEY SET? (4 PTS)

7. LIST FIVE ITEMS ON THE CHAIN SAW THAT NEED TO BE INSPECTED OR MAINTAINED DAILY. (5 PTS)

   1.

   2.

   3.

   4.

   5.

8. DESCRIBE THE CORRECT POSITION OF A SAW FOR STARTING. (4 PTS)

9. DESCRIBE THE CORRECT METHOD FOR PULLING THE STARTER CORD FOR STARTING A SAW. (4 PTS)

10. LIST FIVE SAFETY ITEMS THAT THE OPERATOR SHOULD WEAR FOR ANY CUTTING OPERATION. (5 PTS)

    1.

    2.

    3.

    4.

    5.

11. LIST FIVE FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (5 PTS)

    1.

    2.

    3.

    4.

11. (CONTINUED)

5.

12. ILLUSTRATE THE THREE CUTS FOR FELLING A TREE AND INDICATE THEIR ORDER AND SPECIFICATIONS. (6 PTS)

13. LIST TWO REASONS FOR USING AN UNDERCUT WHEN FELLING A TREE. (4 PTS)

1.

2.

14. WHAT IS A HINGE AND WHAT IS ITS PURPOSE? (4 PTS)

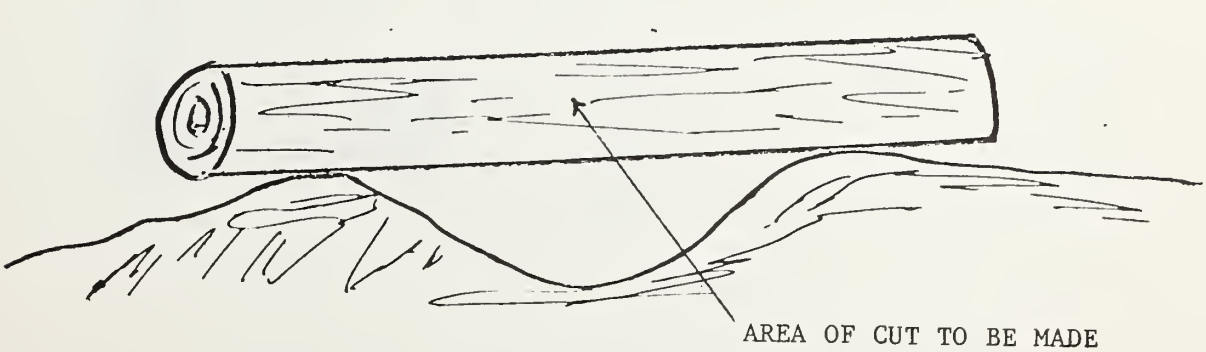
15. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (3 PTS)

1.

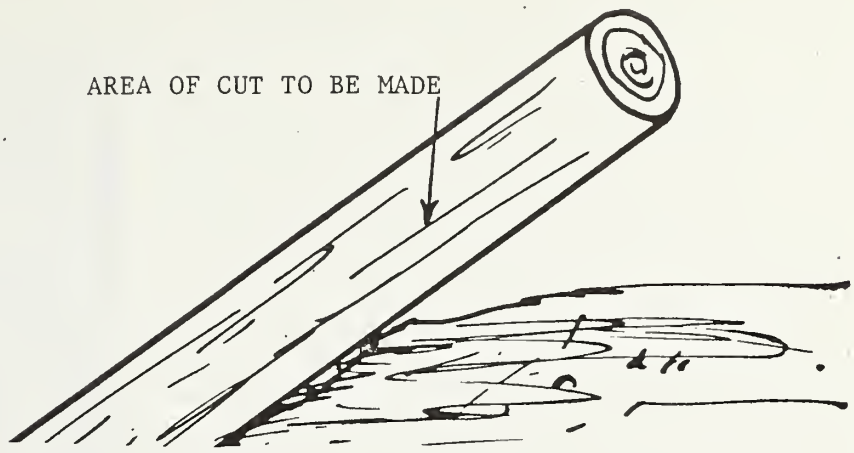
2.

3.

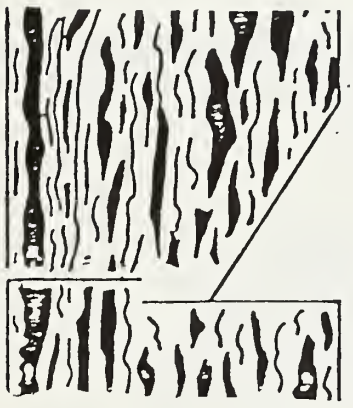
16. DESCRIBE THE TWO CUTS YOU WOULD MAKE WHEN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (6 PTS)



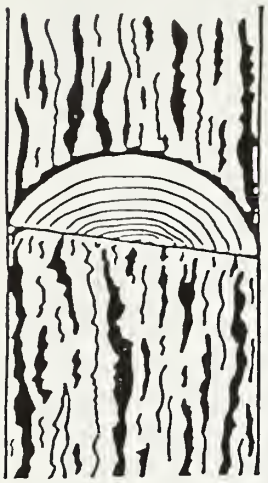
17. DESCRIBE THE CUT(S) YOU WOULD MAKE IN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (6 PTS)



18. IDENTIFY WHICH OF THE TWO ILLUSTRATIONS BELOW IS CORRECT AND EXPLAIN WHAT WOULD OCCUR WHEN THE TREE FALLS USING THE INCORRECT METHOD. (6 PTS)

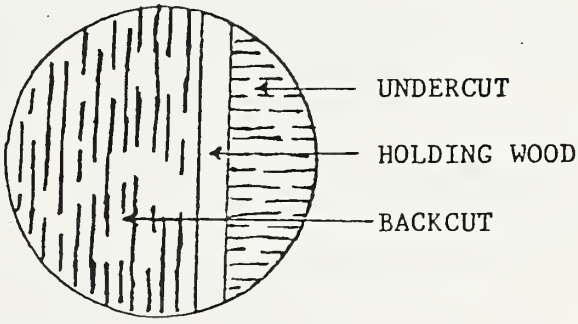


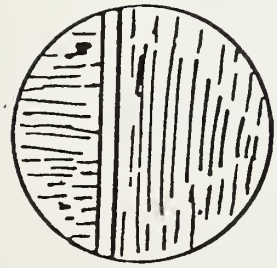
19. DESCRIBE WHAT WOULD OCCUR WHEN A TREE FALLS WITH AN UNDERCUT AS ILLUSTRATED BELOW. (6 PTS)

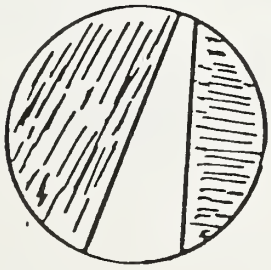


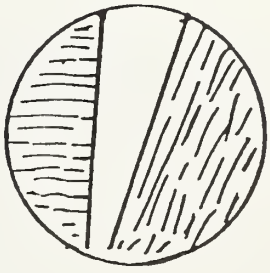
20. DRAW ARROWS TO INDICATE THE DIRECTION OF FALL FOR EACH DIAGRAM, ASSUMING EACH IS A BALANCED TREE. (9 PTS)

DIAGRAM KEY:









CHAIN SAW TRAINING (WW-212A)

FINAL TEST MASTER

1. LIST TEN PARTS OF THE CHAIN SAW AND DESCRIBE THE FUNCTION OF EACH. (10 PTS)
   1. THROTTLE TRIGGER: REGULATES THE AMOUNT OF FUEL ENTERING THE ENGINE FOR COMBUSTION.
   2. THROTTLE LOCK: LOCKS THE THROTTLE TRIGGER OPEN FOR EASE OF STARTING.
   3. SPARK PLUG: IGNITES THE FUEL MIXTURE IN THE COMBUSTION CHAMBER.
   4. ON-OFF SWITCH: TURNS THE SAW ON OR OFF.
   5. CHOKE BUTTON: ALLOWS MORE FUEL TO BE DRAWN INTO THE CARBURETOR TO AID IN STARTING A COLD ENGINE.
   6. MANUAL OILER: PROVIDES A MEANS OF GETTING LUBRICATION TO THE BAR AND CHAIN.
   7. CHAIN OIL RESERVOIR FILLER HOLE: ALLOWS YOU TO FILL THE OIL RESERVOIR.
   8. MUFFLER: REDUCES ENGINE NOISE AND REDUCES ACCIDENTAL FIRE POTENTIAL FROM THE EXHAUST.
   9. CHAIN, CLUTCH, AND SPROCKET GUARD: A SAFETY DEVISE FOR PROTECTING THE OPERATOR AND ALSO TO DIRECT THE CHIPS DOWN AWAY FROM THE HOT EXHAUST ON SOME SAWS.
   10. CLUTCH AND SPROCKET ASSEMBLE: THE MECHANISM FOR ENGAGING THE POWER FROM THE ENGINE TO DRIVING THE CHAIN.
   11. CHAIN TENSION ADJUSTMENT SCREW: ALLOWS THE OPERATOR TO ADJUST THE TENSION OF THE CHAIN UPON THE GUIDE BAR TO ALLEVIATE EXCESSIVE WEAR.
   12. DOGS: ARE USED FOR SAW CONTROL WHILE FELLING AND BUCKING.
   13. STARTER CORD ASSEMBLY AND HOUSING: USED TO SPIN THE ENGINE SO THAT IT WILL START.
   14. AIR FILTER: FILTERS FOREIGN PARTICLES FROM THE AIR AND PROTECTS THE CARBURETOR INTAKES.
   15. CARBURETOR: MIXES THE FUEL WITH AIR TO PROVIDE THE CORRECT FUEL MIXTURE FOR COMBUSTION.
   16. HI AND LO CARBURETOR ADJUSTMENT SCREWS: THE LO ADJUSTMENT IS USED FOR SETTING LOW SPEED RPM AND HI ADJUSTMENT IS USED FOR SETTING HIGH SPEED OR PERFORMANCE RPM.
   17. IDLE SPEED SCREW: USED TO REGULATE THE RPM OF THE ENGINE AFTER THE CARBURETOR ADJUSTMENTS HAVE BEEN MADE.
   18. FUEL TANK: HOLDS THE FUEL MIXTURE.
   19. FUEL FILTER: FILTERS FOREIGN MATTER FROM THE FUEL TO PROTECT THE CARBURETOR JETS FROM CLOGGING.
   20. GUISE BAR: SERVES AS A GUIDE AND CHANNEL FOR THE CUTTING CHAIN TO RUN.
   21. CHAIN: THE PART OF THE CUTTING ATTACHMENT THAT CUTS THE WOOD.

2. DESCRIBE THE PROCEDURE FOR CLEANING AN AIR FILTER. (4 PTS)
   1. REMOVE CARBURETOR HOUSING.
   2. BLOW OFF LARGE JUNKS OF DEBRIS.
   3. REMOVE AIR FILTER.
   4. TURN UPSIDE DOWN AND TAP LIGHTLY.
   5. WASH WITH STRAIGHT GASOLINE OR SOLVENT.
   6. BLOW DRY AND REPLACE.

3. WHAT IS THE BASIC FUEL-OIL MIXTURE FOR THE CHAIN SAW WHEN USING AN UNCONCENTRATED TWO-CYCLE MOTOR OIL? (3 PTS)
   16:1

4. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)
   1. CHISEL CHAIN 30°
   2. CHIPPER CHAIN 35°

5. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)
   FROM THE INSIDE OF THE CUTTER TO THE OUTSIDE.

6. WHAT IS THE PURPOSE OF THE DEPTH GAUGES (RAKERS) AND HOW ARE THEY SET? (4 PTS)
   THEY REGULATE THE DEPTH OF THE CHIP THAT THE CUTTER REMOVES FROM THE WOOD. THEY ARE SET BY LAYING A DEPTH GAUGE GUIDE OVER THE CUTTER AND FLAT FILING TO THE DESIRED SETTING. THE CORNER IS THEN ROUNDED TO ALLEVIATE KICKBACK.

7. LIST FIVE ITEMS ON THE CHAIN SAW THAT NEED TO BE INSPECTED OR MAINTAINED DAILY. (5 PTS)
   1. CUTTERS.
   2. DEPTH GAUGES.
   3. BAR.
   4. STARTER ROPE ASSEMBLY.
   5. AIR CLEANER.
   6. GEAR LUBRICATION BOX.
   7. COOLING FINS.
   8. MUFFLER.
   9. HANDLEBAR NUTS AND BOLTS.
   10. GEAR OIL FOR GEAR DRIVEN SAWS.

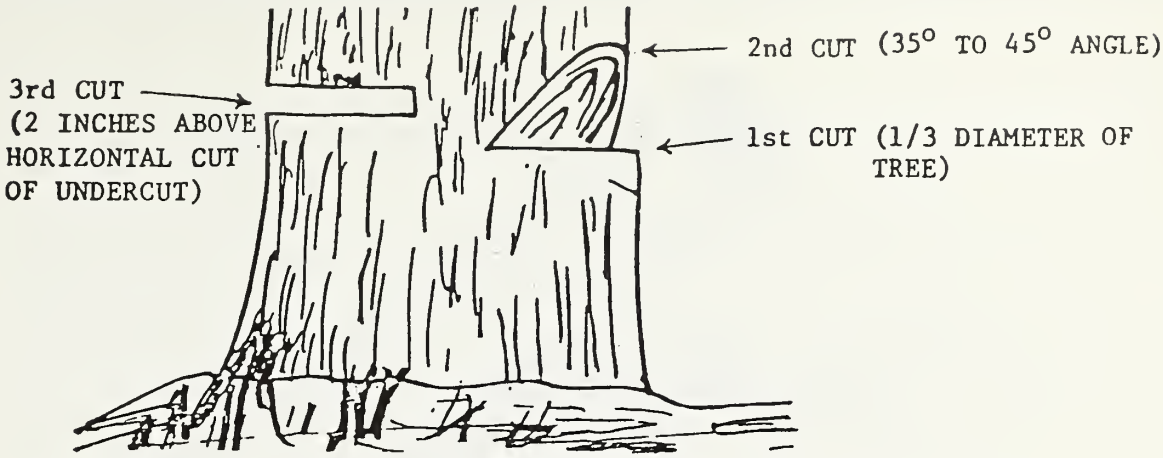
8. DESCRIBE THE CORRECT POSITION OF A SAW FOR STARTING. (4 PTS)
   ON THE GROUND OR FIRM SURFACE, WITH BAR AND CHAIN CLEAR OF OBSTRUCTION.

9. DESCRIBE THE CORRECT METHOD FOR PULLING THE STARTER CORD FOR STARTING A SAW. (4 PTS)
   SHORT, SHARP PULLS.

10. LIST FIVE SAFETY ITEMS THAT THE OPERATOR SHOULD WEAR FOR ANY CUTTING OPERATION. (5 PTS)
    1. CHAPS.
    2. HARD HAT.
    3. GLOVES.
    4. LONG-SLEEVED SHIRT.
    5. LOOSE FITTING PANTS, NO CUFFS.
    6. NON-SKID BOOTS.
    7. PROTECTIVE EYE GLASSES.
    8. EAR PLUGS.

11. LIST FIVE FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (5 PTS)
    1. SPECIES; LIVE OR DEAD.
    2. SIZE; IS SAW LARGE ENOUGH FOR TREE?
    3. SOUNDNESS; ROTTEN, FORKED TOP, DEAD LIMB.
    4. DIRECTION OF LEAN; SLIGHT OR GREAT.
    5. HEAVY BRANCHES; LOPSIDED CROWN.
    6. WIND DIRECTION AND VELOCITY.
    7. NEARBY HAZARDS; TREES OR PEOPLE.
    8. SLOPE OF GROUND.
    9. ESCAPE ROUTE; CLEAR, AT RIGHT ANGLE TO FALL.
    10. SAFE WORKING AREA.

12. ILLUSTRATE THE THREE CUTS FOR FELLING A TREE INDICATING THEIR ORDER AND SPECIFICATIONS. (6 PTS)

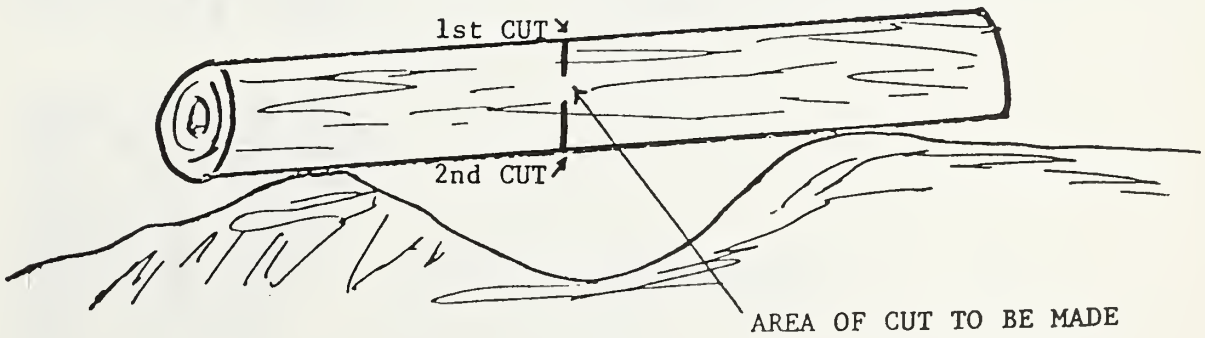


13. LIST TWO REASONS FOR USING AN UNDERCUT WHEN FELLING A TREE. (4 PTS)
    1. IT DIRECTS THE DIRECTION OF FALL.
    2. THE NOTCH RELIEVES SUPPORT OF THAT SIDE OF THE TREE.
    3. THE NOTCH IS AN EMPTY SPACE FOR THE TREE TO CLOSE, THUS AFFECTING A SMOOTH PIVOT OF THE TREE.
    4. IT ASSISTS IN PREVENTING A BARBER-CHAIR.
    5. CAN DETERMINE IF HEARTWOOD IS SOLID OR ROTTEN.

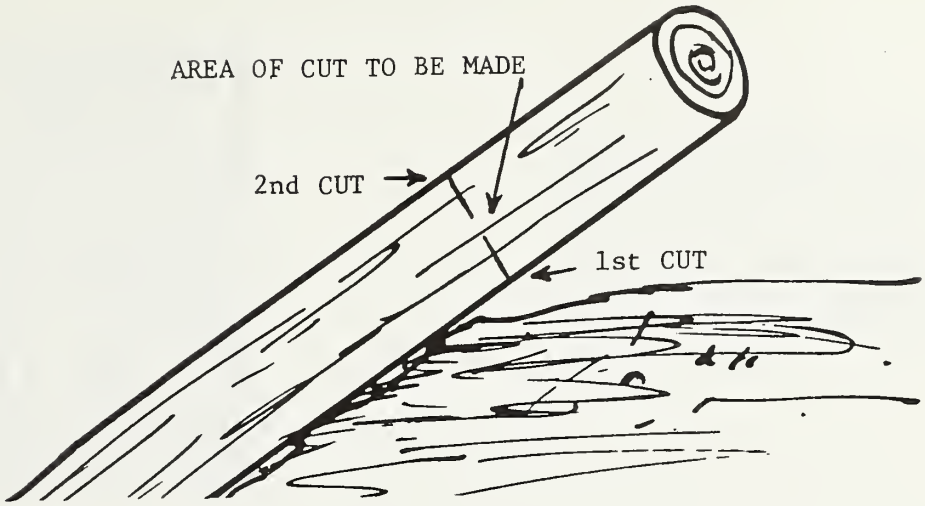
14. WHAT IS A HINGE AND WHAT IS ITS PURPOSE? (4 PTS)
    A HINGE IS THE UNCUT WOOD BETWEEN THE BACKCUT AND UNDERCUT. IT CONTROLS THE FALL OF A TREE UNTIL THE UNDERCUT CLOSES.

15. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (3 PTS)
    1. LOOSE CHAIN.
    2. REINSERTION OF A MOVING CHAIN INTO A PREVIOUSLY BEGUN CUT.
    3. WHEN THE BAR NOSE COMES INTO CONTACT WITH AN OBJECT SUCH AS ANOTHER LOG OR LIMB.
    4. STARTING A CUT WHILE SAW IS NOT UNDER FULL POWER.

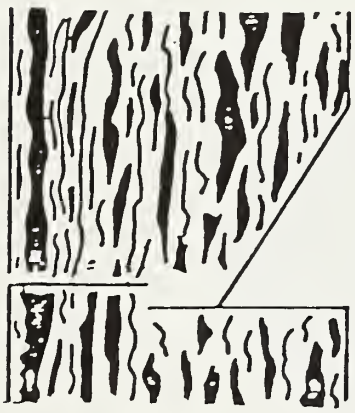
16. DESCRIBE THE TWO CUTS YOU WOULD MAKE WHEN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (6 PTS)



17. DESCRIBE THE CUT(S) YOU WOULD MAKE IN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (6 PTS)



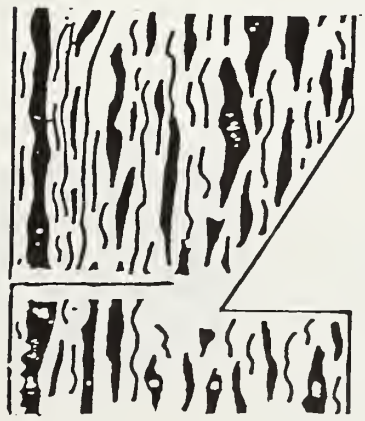
18. IDENTIFY WHICH OF THE TWO ILLUSTRATIONS BELOW IS CORRECT AND EXPLAIN WHAT WOULD OCCUR WHEN THE TREE FALLS USING THE INCORRECT METHOD. (6 PTS)



INCORRECT METHOD

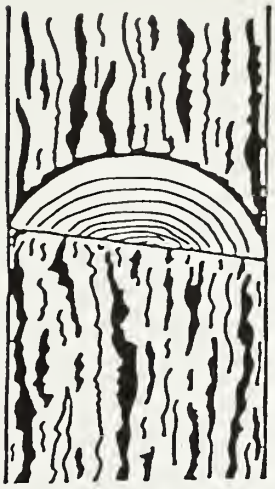
IF SAWN PAST SLOPING CUT ON ONE SIDE IT WILL SWING OR PIVOT TO THE HOLDING SIDE.

IF SAWN PAST SLOPING CUT COMPLETELY ACROSS THE STUMP IT WILL BARBER-CHAIR OR JUMP OFF THE STUMP.



CORRECT METHOD

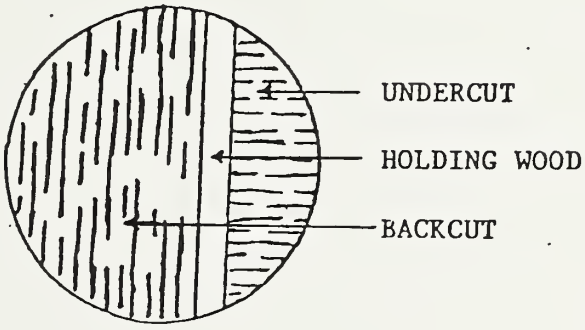
19. DESCRIBE WHAT WOULD OCCUR WHEN A TREE FALLS WITH AN UNDERCUT AS ILLUSTRATED BELOW. (6 PTS)

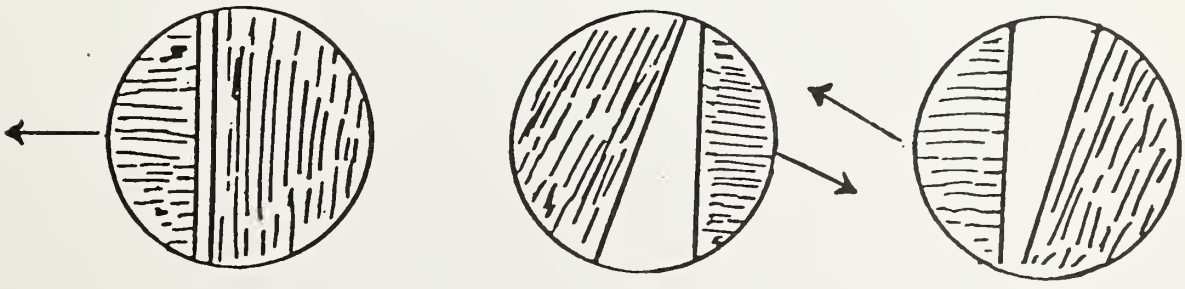


WHEN THE UNDERCUT (FACE) CLOSES THE ONE SECTION CLOSES MUCH FASTER THAN DOES THE OTHER SECTION. THE CLOSED SECTION ACTS AS A PIVOTING POINT. THE FALLING TREE ENTERS THE FACE AND IS HELD BY THE CLOSED SECTION, THEREBY SWINGING THE TREE TOWARD THE CLOSED SECTION.

20. DRAW ARROWS TO INDICATE THE DIRECTION OF FALL FOR EACH DIAGRAM, ASSUMING EACH IS A BALANCED TREE. (9 PTS)

DIAGRAM KEY:





CHAIN SAW TRAINING (WW-212B)

Course Agenda

FIRST

Unit	Time
Introduction	3/4 hour
Components	2 hours
Field Maintenance	1 hour
Basic Operation	3/4 hour
Field Practices	2 hours
Maintenance Practical Application	1 hour

SECOND DAY

Unit	Time
Field Examination	4½ hours
Field Wrap-up	1/2 hour
Written Examination and Course Wrap-up	1 hour

The unit on Field Maintenance may be covered in conjunction with the unit on Components.

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B) TYPE : Lecture, Slide-Tape, & Film

UNIT : Introduction REFERENCES :

TIME : 3/4 hour TRAINING AIDS: Slide/Tape Player, 16 MM Projector, Screen, Slide/Tape SL 1-9, DOUGLAS DENT FILM #1, Easel Paper

OBJECTIVES: UPON COMPLETION OF THIS COURSE THE TRAINEE WILL BE ABLE TO:

1. DEMONSTRATE AND DESCRIBE THE CORRECT AND SAFE PROCEDURES FOR FELLING AND BUCKING MATERIALS UNDER 24 INCHES DBH WITH A CHAIN SAW.
2. DEMONSTRATE AND DESCRIBE THE REQUIRED BASIC MAINTENANCE TO KEEP A CHAIN SAW OPERATIONAL.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. COURSE TITLE	
	II. INSTRUCTOR INTRODUCTIONS	
	III. TRAINEE INTRODUCTIONS	
	IV. EQUIPMENT NEEDS FOR FIELD EXERCISES, BREAKS, MESSAGES, ETC.	
	V. REVIEW PRE-TEST	
	VI. COURSE OBJECTIVES	
	VII. COURSE AGENDA	
	VIII. COURSE INTRODUCTION	SLIDE/TAPE SL 1-9 DOUGLAS DENT FILM #1

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B) TYPE : DEMONSTRATION AND DISCUSSION

UNIT : I CHAIN SAW COMPONENTS REFERENCES : CHAIN SAW MANUFACTURES MAINTENANCE MANUALS

TIME : 2 HOURS TRAINING AIDS: 35MM PROJECTOR, OVERHEAD PROJECTOR, SCREEN, VG I - 1-3, SL I - 1&2, CHAIN SAW, FUEL MIXING OIL, EASEL PAPER

OBJECTIVES: LISTED UNDER II IN THE OUTLINE

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THIS LESSON IS TO ACQUAINT THE TRAINEE WITH THE CORRECT NOMENCLATURE OF THE CHAIN SAW SO THAT HE CAN IDENTIFY THE LOCATION AND FUNCTION OF EACH PART. THE UNIT MAY BE COVERED IN CONJUNCTION WITH UNIT II, FIELD MAINTENANCE. II. UNIT OBJECTIVES UPON COMPLETION OF THIS UNIT THE TRAINEE WILL BE ABLE TO: A. LIST 21 PARTS OF THE CHAIN SAW AND DESCRIBE THE FUNCTION OF EACH. B. ILLUSTRATE THE CUTTER SHAPES FOR THE THREE BASIC TYPES OF SAW CHAINS. C. LIST THREE PARTS OF THE SAW CHAIN AND EXPLAIN THE FUNCTION OF EACH.	

TIME	OUTLINE	KEY POINTS AND AID CUES

D. LIST THE THREE MAIN PARTS OF THE CUTTER AND EXPLAIN THE FUNCTION OF EACH.

E. LIST THE TWO LUBRICATION SYSTEMS OF THE CHAIN SAW AND DESCRIBE EACH.

F. LIST TWO FILTRATION SYSTEMS AND GIVE THE LOCATION AND FUNCTION OF EACH.

III. CLASS ARRANGEMENT AND STRUCTURE

(THE FOLLOWING IS INTENDED ONLY AS A GUIDE AND CAN BE DEVIATED FROM AT THE DISCRETION OF THE INSTRUCTOR.

A. THE INSTRUCTOR WILL ARRANGE THE TRAINEES INTO GROUPS OF THREE PER TABLE OR PER WORK AREA, ON THE BASIS OF THEIR EXPERIENCE LEVEL PRIOR TO SECTION IV.

B. FOR SECTIONS IV-XIII OF THIS UNIT, THE INSTRUCTOR SHOULD DISASSEMBLE, NAME, AND EXPLAIN THE FUNCTION OF EACH PART OF THE CHAIN SAW. AT THE SAME TIME, THE TRAINEES SHOULD DISASSEMBLE THEIR SAW SO THEY CAN VISUALLY SEE EACH PART THE INSTRUCTOR IS EXPLAINING.

IV. THE CHAIN SAW

A CHAIN SAW IS A LIGHTWEIGHT, PORTABLE POWER TOOL USED FOR CUTTING WOOD. ITS APPLICATION HAS SAVED HOURS OF TIME AND CREW FATIGUE IN MANY WORK PROJECTS. ESSENTIALLY A CHAIN SAW IS COMPOSED OF TWO UNITS: ONE BEING THE POWER PLANT, WHICH IS A TWO-CYCLE AIR COOLED ENGINE: THE OTHER IS THE CUTTING UNIT.

V. POWER PLANT

SINCE THIS LESSON IS NOT DESIGNED AS A MECHANICS COURSE,

TIME	OUTLINE	KEY POINTS AND AID CUES

THE ENGINE WILL BE COVERED ONLY BRIEFLY. BECAUSE TWO-CYCLE ENGINES DO NOT HAVE VALVE GEARS THEY HAVE EXHAUST AND INTAKE OPENINGS IN THE SIDE OF THE CYLINDER. THE POWER CYCLE OF THE TWO-CYCLE ENGINE IS TWO STROKES: ONE UP, THE OTHER DOWN. THE CRANKCASE OF THE ENGINE IS SEALED AND USED TO FOLD THE FUEL CHARGE BEFORE IT GOES INTO THE CYLINDER FOR COMBUSTION (FIGURE 1).

VG I - 1

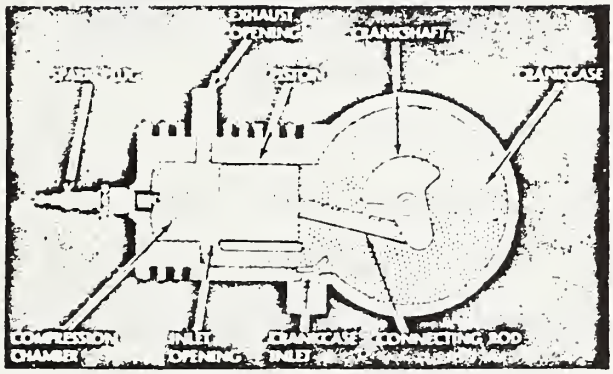


FIGURE 1

A. 1ST STROKE. AS THE PISTON GOES UP THE CYLINDER, IT CLOSES THE INTAKE AND EXHAUST PORT OPENINGS: IT THEN DRAWS A FUEL CHARGE THROUGH THE CARBURETOR INTO THE SEALED CRANKCASE. THE FUEL CHARGE IN THE CYLINDER IS COMPRESSED IN THE LATER PART OF THE UP STROKE, AND THE SPARK PLUG FIRES WHEN THE PISTON IS NEAR THE TOP OF THE STROKE (FIGURE 2).

TIME	OUTLINE	KEY POINTS AND AID CUES

VG I - 1

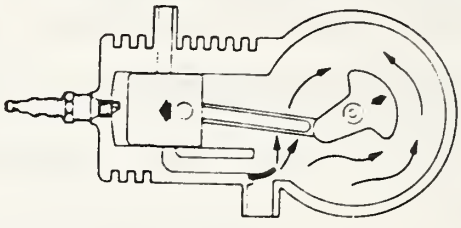


FIGURE 2

B. 2ND STROKE. THE BURNING FUEL DRIVES THE PISTON DOWN THE CYLINDER AND BEGINS TO BUILD PRESSURE IN THE CRANKCASE. ABOUT HALFWAY DOWN THE CYLINDER, THE PISTON UNCOVERS THE EXHAUST PORT AND THE BURNED GASES LEAVE. THE PISTON THEN UNCOVERS THE INLET PORT AND THE PRESSURE IN THE CRANKCASE FORCES A NEW CHARGE INTO THE CYLINDER. DURING THE REPEAT OF THE COMPRESSION STROKE, THE NEW FUEL CHARGE BLOWS OUT THE LAST OF THE EXHAUST GASES AND THE CYCLE IS REPEATED (FIGURE 3).

VG I - 1

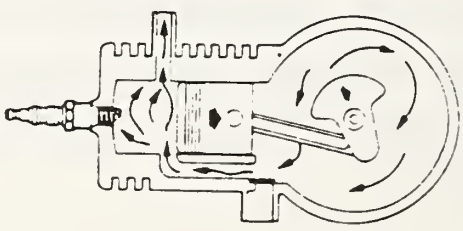


FIGURE 3

TIME	OUTLINE	KEY POINTS AND AID CUES

VI. CUTTING ATTACHMENT

THE CUTTING ATTACHMENT CONSISTS OF A CLUTCH DRUM AND A SPROCKET THAT DRIVES THE NARROW STEEL CHAIN FITTED WITH VERY SHARP CUTTING TEETH, CALLED CUTTERS, AROUND A THIN STEEL GUIDE BAR (FIGURE 4).

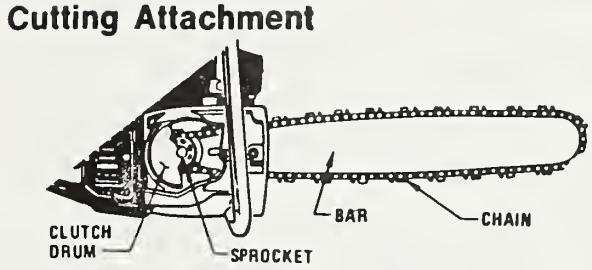


FIGURE 4

A. SAW CHAIN. THE SAW CHAIN IS MADE OF METAL PARTS RIVETED TOGETHER TO FORM A FLEXIBLE LOOP (FIGURE 5).

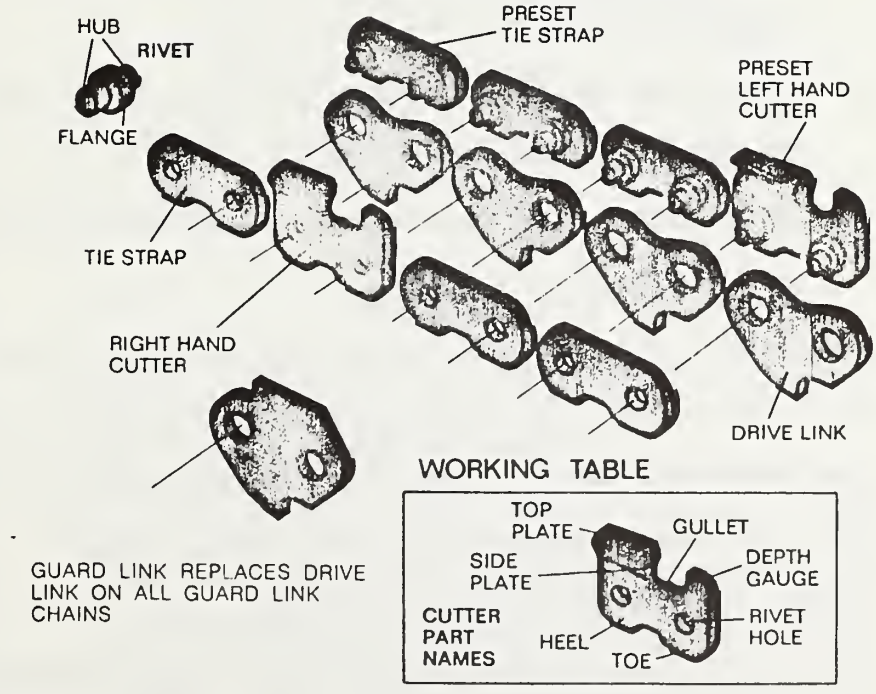


FIGURE 5

VG I - 2

TIME	OUTLINE	KEY POINTS AND AID CUES
	1. DRIVE LINK. THE CENTER LINK, OR DRIVE LINK, OF THE CHAIN HOOKS INTO THE SPROCKET SO THAT THE CHAIN CAN BE PROPELLED AROUND THE BAR.	
	2. CUTTERS. THE SAW CHAIN HAS BOTH LEFT-HAND AND RIGHT-HAND CUTTERS. CUTTERS HAVE A TOP PLATE THAT IS SHARPENED TO A FINE EDGE FOR CUTTING. THE SIDE PLATE CUTTER RELEASES THE WOOD ON THE SIDE WHILE THE TOP PLATE CHIPS WOOD OUT OF THE MIDDLE SIMILAR TO A CHISEL.	SL I - 1
	3. DEPTH GAUGE (RAKERS). THE DEPTH GAUGE DETERMINES HOW DEEP THE TOP PLATE PENETRATES INTO THE WOOD EACH TIME IT CUTS A "CHIP".	
	THERE ARE THREE BASIC TYPES OF SAW CHAINS.	VG I - 3
	CHIPPER CHAIN--ROUNDED SIDE PLATE AND TOP PLATE WITH ROUNDED APPEARANCE.	
	SEMI-CHISEL CHAIN--SIDE PLATE AND TOP PLATE FLAT WITH THE CORNER BETWEEN THEM ROUNDED.	
	CHISEL CHAIN--SIDE PLATE AND TOP PLATE FLAT WITH THE CORNER BETWEEN THEM SQUARE.	
	THE CHIPPER CHAIN DOES NOT CUT AS FAST AS THE SEMI-CHISEL OR THE FULL CHISEL CHAIN BECAUSE IT MUST CUT THROUGH THE SAME WOOD FIBER SEVERAL TIMES AS IT PASSES THROUGH THE TREE. THIS MEANS MORE WORK FOR THE ENGINE, SLOWER CUTTING ACTION, AND SHORTER CHAIN LIFE.	
	THE MAIN ADVANTAGE OF THE CHIPPER CHAIN IS THE QUICKNESS AND EASE OF MAINTENANCE.	

TIME	OUTLINE	KEY POINTS AND AID CUES

B. SPROCKET. THE SPROCKET RELAYS THE POWER FROM THE ENGINE TO PULL THE CHAIN AROUND THE BAR AND THROUGH THE WOOD.

C. CLUTCH DRUM. THE CLUTCH DRUM IS CONNECTED SO THAT IT CAN SLIP OR DRIVE DEPENDING UPON THE POWER OR REVOLUTIONS OF THE ENGINE. ITS PRIMARY PURPOSE IS TO RELAY THE POWER OF THE ENGINE TO THE SPROCKET WHICH PULLS THE CHAIN AROUND THE BAR.

D. BAR. THE BAR GUIDES THE CHAIN SO THAT A STRAIGHT CUT CAN BE ACCOMPLISHED. BARS COME IN LENGTH OF 10 TO 44 INCHES AND LARGER, DEPENDING ON THE INTENDED JOB AND ARE CONNECTED TO THE SAW BY TWO MOUNTING LUGS (FIGURE 6). SL I - 2

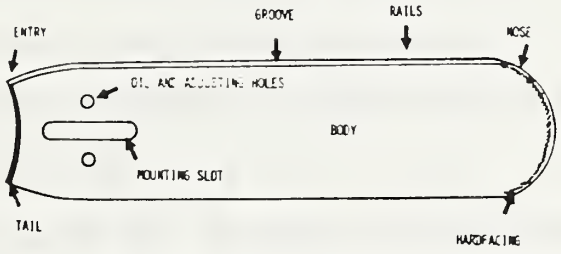


FIGURE 6

1. ENTRY. THE ENTRY IS DESIGNED TO ALLOW THE CHAIN TO ENTER THE BAR FROM THE SPROCKET.

2. OIL AND ADJUSTING HOLES. THE OIL HOLES ALLOW THE CHAIN OIL TO SEEP INTO THE GROOVE SO THAT THE CHAIN CAN BE LUBRICATED. (MORE WILL BE SAID ABOUT THIS LATER.) THE ADJUSTING HOLES ALLOW THE BAR TO BE MOVED FORWARD OR BACKWARDS SO THAT CORRECT CHAIN

TIME	OUTLINE	KEY POINTS AND AID CUES

TENSION CAN BE SET.

3. GROOVE. THE GROOVE IS A SLOT IN THE BAR WHERE THE DRIVE LINKS RUN.

4. RAILS. THE RAILS SERVE AS A 90^{o} GUIDE TO KEEP THE SAW CHAIN RUNNING STRAIGHT. IF THE RAILS ARE SPLAYED OR UNEVEN, THE CHAIN RUNS TILTED, CAUSING CURVED CUTS.

5. NOSE. THE FRONT OF THE GUIDE BAR.

6. HARDFACING. IS A HARDENED SURFACE ON THE NOSE OF THE BAR TO REDUCE WEAR ON THE BAR FROM THE ROTATING CHAIN.

7. BODY. THE MAJOR PART OF THE GUIDE BAR.

8. MOUNTING SLOT. THIS SLOT HAS TWO FUNCTIONS.

   A. IT ALLOWS THE MOUNTING STUDS TO GO THROUGH THE BAR, TO FIX IT TO THE SAW.

   B. IT ALLOWS THE BAR TO ADJUST CHAIN TENSION.

9. TAIL. THE TAIL IS THE EXIT PART OF THE CHAIN AND ALLOWS THE DRIVE LINKS TO OMIT ANY DIRT PARTICLES THAT MAY HAVE ACCUMULATED IN THE GROOVE.

E. PLATES. THERE ARE TWO PLATES ON A CHAIN, THE INNER PLATE AND THE OUTER PLATE. THE PLATES ARE MADE FROM HIGH CARBON STEEL AND SERVE THREE FUNCTIONS (FIGURE 7).

1. THEY KEEP THE CHAIN FROM JUMPING OUT AND DAMAGING THE SAW.

2. THEY DIRECT THE OIL INTO THE CHAIN ASSEMBLY.

TIME	OUTLINE	KEY POINTS AND AID CUES

3. THEY HELP KEEP DIRT AND PARTICLES FROM ENTERING THE BAR.

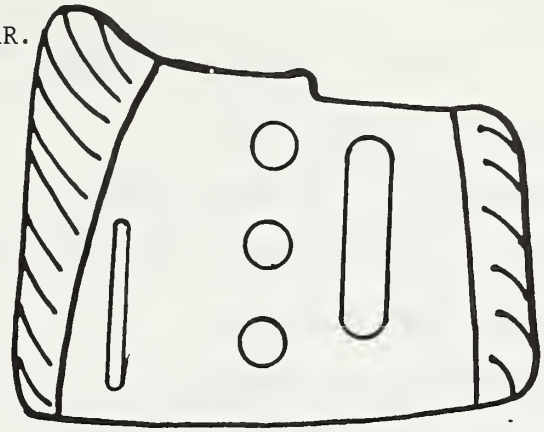


FIGURE 7

F. DRIVE CASE COVER. THIS COVER PROTECTS THE CLUTCH AND SPROCKET MECHANISM FROM ANY DAMAGE, HELPS TO KEEP THE OPERATOR FROM GETTING HIS HANDS CAUGHT OR CUT IN THE CHAIN, AND DIRECTS THE WOOD CHIPS OUT THE BOTTOM.

G. BAR ADJUSTING SCREW. THE BAR ADJUSTING SCREW FITS INTO THE ADJUSTING HOLE IN THE GUIDE BAR (FIG. 6) AND MOVES THE BAR EITHER FORWARD OR BACKWARD SO THE CORRECT CHAIN TENSION CAN BE SET.

H. BUMPER SPIKE (DOGS). THE DOGS IS A SAWLIKE ATTACHMENT MOUNTED NEXT TO THE BAR SO THE OPERATOR CAN HOOK HIS SAW INTO THE LOG OR TREE FOR BETTER CONTROL WHILE CUTTING (FIGURE 8).

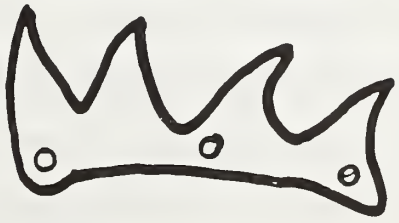


FIGURE 8

TIME	OUTLINE	KEY POINTS AND AID CUES
	VII. LUBRICATION SYSTEM THIS SYSTEM IS A MEANS OF MOVING A LUBRICANT TO ANY MOVING PART TO REDUCE FRICTION AND HEAT. A. ENGINE LUBRICATION. TWO-CYCLE ENGINES NOT HAVING VALVE GEARS LEAVE ONLY THREE PARTS TO BE LUBRICATED. THEY ARE: 1. THE CRANK SHAFT BEARINGS. 2. THE CONNECTING ROD BEARINGS. 3. THE PISTON RINGS AND CYLINDER WALL. OIL IS APPLIED TO THESE AREAS BY MIXING IT WITH REGULAR GRADE GASOLINE USING THE MANUFACTURE'S RECOMMENDED TWO-CYCLE OIL AND MIXING RATIO. IT IS THEN CONVERTED TO A MIST BY THE INDUCTION SYSTEM BEFORE GOING INTO THE COMBUSTION CHAMBER.	STRESS USING ONLY REGULAR GRADE GAS, NOT UNLEADED OR PREMIUM. SHOW EXAMPLES OF FUEL MIXING OIL.
	B. CUTTING ATTACHMENT LUBRICATION. CHAIN LUBRICATION IS ACCOMPLISHED BY TWO METHODS, BOTH SUPPLIED BY THE SAME OIL RESERVOIR LOCATED UNDER THE ENGINE. 1. AUTOMATIC CHAIN OILER. PROVIDES A CONTINUOUS FLOW OF LUBRICATING OIL TO THE BAR AND CHAIN DURING OPERATION. THE AMOUNT OF FLOW IS ADJUSTABLE ON MOST SAWS, BUT IS LEFT TO A MECHANIC.	RULE OF THUMB ~~FOR~~ AUTOMATIC CHAIN OILER: 1 TANK OIL/ 1 TANK GAS.
	2. MANUAL CHAIN OILER. PROVIDES LUBRICATION WHERE CUTTING OPERATIONS REQUIRE MORE OIL OR WHEN THE AUTOMATIC OILER MALFUNCTIONS. THE PUMP BUTTON IS LOCATED ON THE LEFT HAND SIDE OF THE HANDLE ON THE HOMELITE SAW AND PUMPS OIL THROUGH A COPPER LINE TO THE BAR AND CHAIN. ON OTHER SAWS IT IS ALSO EASILY ACCESSIBLE FOR THE OPERATOR TO USE.	CAN BE LOCATED IN DIFFERENT LOCATION ON SOME SAWS AND NOT AT ALL ON OTHERS WITH SET AUTOMATIC OILERS.

TIME	OUTLINE	KEY POINTS AND AID CUES
	VIII. FUEL SYSTEM THE FUEL SYSTEM ON A CHAIN SAW IS SEVERAL COMPONENTS WORKING IN UNISON TO MAKE THE SAW OPERABLE. A. FUEL TANK. THE FUEL TANK IS NORMALLY LOCATED IN THE FRONT OF THE SAW WITH THE FILLER CAP RESTING ON TOP. ITS FUNCTION IS STORAGE FOR THE FUEL MIXTURE. B. FUEL FILTER. THE FUEL FILTER IS LOCATED IN THE FUEL TANK. IT IS CONNECTED TO THE LINE THAT RUNS FROM THE FUEL TANK TO THE CARBURETOR. THIS FILTER IS A REPLACEABLE UNIT IN THE FIELD. IT FILTERS PARTICLES FROM THE FUEL SO THEY WILL NOT OBSTRUCT THE FUEL FLOW OR MIXTURE JETS ON THE CARBURETOR. C. CARBURETOR. THE FUNCTION OF THE CARBURETOR IS TO MIX THE FUEL AND AIR IN A CORRECT RATIO. THE CARBURETOR IS CONNECTED TO THE ENGINE DIRECTLY OPPOSITE THE INTAKE PORTS. D. AIR FILTER. THE AIR FILTER IS LOCATED OVER THE CARBURETOR. IT FILTERS FOREIGN MATERIALS FROM THE AIR. E. IDLE SCREW. THE IDLE SCREW IS A MECHANICAL STOP FOR THE THROTTLE AND REGULATES HOW MUCH FUEL THE CARBURETOR OR ENGINE USES WHILE THE SAW IS IDLING. F. THROTTLE LINKAGE. THE THROTTLE ON A SAW HAS THE SAME FUNCTION AS ON ANY GASOLINE OPERATED PIECE OF EQUIPMENT. IT CONTROLS THE QUANTITY OF FUEL THAT THE ENGINE BURNS. ON A CHAIN SAW THE THROTTLE BUTTON IS LOCATED IN THE HANDLE ON THE BACK OF THE SAW WITH A LINKAGE RUNNING TO THE CARBURETOR SHAFT.	SOME SAWS HAVE DOUBLE TRIGGER FOR SAFETY PURPOSES.

TIME	OUTLINE	KEY POINTS AND AID CUES
	G. THROTTLE LOCK BUTTON. THE THROTTLE LOCK BUTTON IS ON THE RIGHT HAND SIDE OF THE HANDLE AND LOCKS THE THROTTLE OPEN FOR EASE OF STARTING AT THE HIGH-SPEED SETTING.	
	H. CHOKE. THE CHOKE IS LOCATED ON THE RIGHT HAND SIDE OF THE HANDLE ON THE SAW AND IS USED ONLY FOR COLD STARTS. THE CHOKE IS CONNECTED TO THE CARBURETOR VIA A LINKAGE THAT RUNS THROUGH THE CARBURETOR HOUSING, AND IS NEEDED TO CUT DOWN THE AIR FLOW TO ENRICH THE FUEL MIXTURE.	LOCATION CAN VARY FROM SAW TO SAW ESPECIALLY FOREIGN SAWS.
	IX. IGNITION SWITCH THE IGNITION SWITCH IS USED TO TURN THE SAW ON OR OFF. ALSO IT HAS THE DUAL PURPOSE OF BEING A SAFETY MECHANISM.	
	X. STARTER ASSEMBLY THE STARTER CORD AND RETURN SPRING ARE LOCATED IN A HOUSING ON THE LEFT HAND SIDE OF A CHAIN SAW. THE FUNCTION OF THE STARTER ASSEMBLY IS TO START THE ENGINE BY ACTIVATING THE MAGNETO WHICH SENDS A CHARGE TO THE SPARK PLUT.	
	XI. SPARK PLUG THE SPARK PLUG IS LOCATED IN THE HEAD ON TOP OF THE CYLINDER AND IS USED TO IGNITE THE FUEL AIR MIXTURE.	
	XII. MUFFLER THE MUFFLER ON A CHAIN SAW SERVES THREE PURPOSES. A. IT HAS A SPARK ARRESTER BUILT INTO IT. B. THE SOUND SILENCER MUFFLER PATENTED BY MCCULLOCH IS DESIGNED TO REDUCE HIGH-FREQUENCY NOISE IMPULSE BY 75 PERCENT AND OVERALL ENGINE NOISE BY 50 PERCENT, COMPARED TO STANDARD CAVITY-TYPE MUFFLERS.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	C. IT CONTROLS THE AMOUNT OF RAW GASES EMITTED INTO THE ENVIRONMENT.	
	XIII. COMPRESSION RELEASE	
	THE COMPRESSION RELEASE IS USED TO RELEASE THE ENGINE COMPRESSION TO AID IN EASE OF STARTING THE CHAIN SAW.	
	XIV. SUMMARY	
	A. QUESTIONS AND ANSWERS.	
	B. REVIEW UNIT OBJECTIVES.	

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B)

TYPE : DEMONSTRATION AND DISCUSSION

UNIT : II CHAIN SAW FIELD MAINTENANCE

REFERENCES : CHAIN SAW MANUFACTURERS . MAINTENANCE MANUALS
OREGON SAW CHAIN MAINTENANCE MANUAL

TIME : 1 HOUR

TRAINING AIDS: CHAIN SAW, 35MM SLIDE PROJECTOR, SCREEN, SL II
1 THRU 19 GREASE RAGS OR PAPER TOWELS, EASEL PAPER

OBJECTIVES: LISTED UNDER II IN THE OUTLINE

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THIS UNIT IS TO ACQUAINT THE TRAINEE WITH THE CORRECT PROCEDURES FOR FIELD MAINTENANCE OF THE COMMONLY USED CHAIN SAWS. THIS UNIT MAY BE COVERED IN CONJUNCTION WITH UNIT I, COMPONENTS.	

TIME	OUTLINE	KEY POINTS AND AID CUES

II. UNIT OBJECTIVES

UPON COMPLETION OF THIS UNIT THE TRAINEE WILL BE ABLE TO:

A. STATE THE BASIC FUEL-OIL MIXTURE FOR THE CHAIN SAW.

B. EXPLAIN WHEN AND HOW TO MAINTAIN BOTH THE AIR AND FUEL FILTERS.

C. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THE FUNCTION OF EACH.

D. LIST THE ORDER OF CARBURETOR ADJUSTMENTS AND DESCRIBE HOW EACH IS MADE.

E. LIST THREE PROBLEMS THAT MAY CAUSE AN IGNITION FAILURE.

F. DESCRIBE THE PROCEDURE TAKEN TO ADJUST THE STARTER CORD SPRING ACTION.

G. DESCRIBE THE PROCEDURE IN REMOVING AND REPLACING THE BAR.

H. DESCRIBE THE CORRECT PROCEDURE FOR ADJUSTING THE TENSION OF THE CHAIN.

I. STATE THE RECOMMENDED FILING ANGLE FOR SHARPENING THE CUTTERS.

J. EXPLAIN THE PURPOSE OF DEPTH GAUGES AND HOW THEY ARE SET.

K. LIST 8 PARTS OF THE SAW THAT SHOULD BE INSPECTED OR MAINTAINED DAILY.

III. INTRODUCTION

A CHAIN SAW IS SIMILAR TO ANY OTHER PIECE OF MECHANICAL EQUIPMENT. PROPER USE AND MAINTENANCE OF BOTH THE SAW AND CHAIN GREATLY INCREASES THEIR USEFUL LIFE. A PROPERLY CARED FOR CHAIN SAW CUTS QUICKER, AND GIVES MANY MORE HOURS OF TROUBLE-FREE SERVICE. IN THIS UNIT YOU WILL BE EXPOSED TO EVERY DAILY AND PERIODIC MAINTENANCE AND SERVICING

TIME	OUTLINE	KEY POINTS AND AID CUES
	PROCEDURE THAT YOU WILL NEED TO KNOW TO PERFORM FIELD MAINTENANCE ON A CHAIN SAW. AS A CATCHALL FOR ALL MAINTENANCE IT'S NICE TO HAVE AN OWNER'S MANUAL AVAILABLE FOR THE MAKE AND MODEL OF THE SAW BEING USED. THE UNIT WILL BE ORGANIZED INTO THREE MAJOR SEGMENTS: ENGINE OR POWER PLANT MAINTENANCE. CUTTING COMPONENTS MAINTENANCE. DAILY AND PERIODIC MAINTENANCE.	
	IV. FUEL AND INDUCTION SYSTEM	
	THE GRADE OF GASOLINE IS VERY IMPORTANT IN MACHINERY. IN THE CHAIN SAW, UNCONTAMINATED REGULAR GRADE GASOLINE IS USED WHEN MIXED WITH A HIGH GRADE TWO-CYCLE OIL. DO NOT USE HIGH LEAD CONTENT (PREMIUM) OR UNLEADED GASOLINE IN ANY TWO-CYCLE ENGINE.	PREFERABLY 88 OCTAIN REGULAR GASOLINE
	A. MIXING FUEL. ALWAYS MIX THE GAS AND OIL IN A CLEAN SAFETY CAN THEN POUR THE MIXTURE INTO THE SAW TANK. FACTORY RECOMMENDATION ARE 16:1 GASOLINE TO OIL FOR THE HOMELITE AND MCCULLOCH RESPECTIVELY FOR STANDARDIZATION PURPOSES. IT IS BEST TO USE THE MAC OIL WITH A MCCULLOCH AND HOMELITE OIL WITH A HOMELITE, BUT SUBSTITUTIONS CAN BE MADE AS LONG AS IT'S A HIGH QUALITY TWO-CYCLE OIL AND THE CORRECT WEIGHT. MCCULLOCH AND HOMELITE DO MAKE A CONCENTRATED OIL AND SHOULD BE USED IF IT IS AVAILABLE. NEVER TRY TO MIX GASOLINE AND OIL IN THE SAW TANK OR USE A MULTI-VISCOSITY DETERGENT MOTOR OIL	

TIME	OUTLINE	KEY POINTS AND AID CUES
	INTENDED FOR FOUR-CYCLE ENGINES. ALSO CHECK TO SEE THAT YOUR SAW GAS AND OIL CONTAINERS ARE IN GOOD CONDITION AND THAT YOU HAVE A SUFFICIENT SUPPLY. CAUTION!! NEVER REMOVE THE FUEL CAP WHEN THE TANK IS FULL AND THE ENGINE IS HOT, BECAUSE THE FUEL IS UNDER PRESSURE DUE TO EXPANSION. ALWAYS LOOSEN THE CAP ONE-HALF TURN AND LET THE PRESSURE BLEED OFF BEFORE REMOVAL TO PREVENT SPILLAGE.	
	B. FUEL FILTER. THE FUEL FILTER SHOULD BE REPLACED WHEN IT BECOMES DIRTY. CLOGGED FUEL FILTERS CAN CAUSE A LOSS OF POWER AND STARTING PROBLEMS. THIS FILTER CANNOT BE CLEANED, SO THE ELEMENT MUST BE REPLACED. TO REPLACE THE FUEL FILTER, REACH INTO THE GAS TANK AND PULL OUT THE FILTER AND RUBBER HOSE THAT CONNECTS TO THE CARBURETOR. BE CAREFUL NOT TO DISCONNECT THE HOSE FROM THE CARBURETOR. THEN REMOVE THE OLD FELT FILTER AND REPLACE WITH A NEW FILTER. GENERALLY YOU REPLACE A FUEL FILTER ON A RATIO OF 3 TO 1 TO AN AIR FILTER. WHEN REPLACING THE FILTER BACK INTO THE TANK, MAKE SURE THAT IT REACHES TO THE BOTTOM SO THE ENGINE CAN UTILIZE ALL THE FUEL IN THE TANK.	SL II - 1

TIME	OUTLINE	KEY POINTS AND AID CUES
	C. AIR FILTER. THE AIR FILTER SHOULD BE CLEANED DAILY OR SOONER DEPENDING ON CONDITIONS. TO CLEAN THE AIR FILTER FIRST CLOSE THE CARBURETOR CHOKE TO PREVENT PARTICLES FROM ENTERING THE CYLINDER THEN REMOVE THE CARBURETOR HOUSING COVER AND BLOW OR SHAKE OFF THE LOOSE CHIPS AND PARTICLES. THEN REMOVE THE FILTER AND WASH IT IN A CLEAN SOLVENT, STRAIGHT GASOLINE, OR DETERGENT. DO NOT USE MIXED GAS BECAUSE IT LEAVES AN OIL FILM THAT COLLECTS DIRT. IN EXTREME CONDITIONS YOU MAY USE MIXED GAS BUT GENERALLY THIS IS NOT A GOOD PRACTICE. AFTER CLEANING THE FILTER, BLOW IT DRY, BUT NOT WITH A HOT EXHAUST AND THEN REPLACE. BEFORE REPLACING THE CLEAN FILTER REMOVE ANY SAWDUST OR DIRT THAT MAY HAVE COLLECTED IN THE CARBURETOR HOUSING. WHEN THE FILTER IS REPLACED MAKE SURE THE EDGES SEAL PROPERLY AND THE COVER IS ON STRAIGHT SO THAT IT DOES NOT BREAK WHEN IT'S FASTENED DOWN. CAUTION!! NEVER OPERATE A CHAIN SAW WITHOUT AN AIR FILTER.	SL II - 2
	D. CARBURETOR ADJUSTMENTS. IF A PROBLEM ARISES OR PRELIMINARY SETTINGS ARE NECESSARY THIS IS THE PROPER PROCEDURE FOR EACH ADJUSTMENT.	
	1. IDLE SPEED ADJUSTMENT SCREW.	
	A. REMOVE THE AIR FILTER AND COVER SO YOU CAN SEE	

TIME	OUTLINE	KEY POINTS AND AID CUES
	THE THROTTLE STOP LEVER.	
	B. BACK THE IDLE SPEED SCREW OUT, THEN TURN IT BACK IN UNTIL IT JUST TOUCHES THE THROTTLE STOP LEVER. THEN TURN THE SCREW IN 3/4 OF A TURN MORE FOR A ROUGH SETTING BEFORE FINE TUNING.	
	C. REPLACE FILTER AND COVER.	
	CAUTION!! DO NOT ATTEMPT TO MAKE CARBURETOR ADJUSTMENTS WITH THE AIR FILTER AND COVER UNLESS ADJUSTMENTS ARE ON THE INSIDE.	
	2. LO-SPEED MIXTURE SCREW.	SL II - 3
	A. MARKED (LO) ON HOMELITE SAW ON SIDE OF THROTTLE HANDLE ASSEMBLY.	
	B. GENTLY TURN THE SCREW UNTIL IT SLIGHTLY BEARS AGAINST THE ORIFICE, THEN BACK IT OUT ONE FULL TURN.	
	CAUTION!! BEFORE MAKING ANY CARBURETOR MIXTURE ADJUSTMENT, INSURE THE FUEL CAP IS BREATHING PROPERLY AND CLEAN THE AIR FILTER. FINAL CARBURETOR ADJUSTMENTS CAN NOW BE MADE. MAKE FINAL ADJUSTMENTS ONLY AT OPERATING TEMPERATURE.	
	3. ADJUSTMENT FOR IDLING.	
	A. THE PRELIMINARY ADJUSTMENT THAT YOU HAVE NOW MADE SHOULD ENABLE THE SAW TO RUN AND WARM UP. NOW IT IS TIME TO MAKE THE FINAL ADJUSTMENTS.	
	B. THEN TURN THE LO NEEDLE TO THE RIGHT OR LEFT TO FIND THE MIXTURE RESULTING IN THE FASTEST SMOOTH IDLE.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	C. NEXT, TURN THE IDLE SPEED SCREW TO ADJUST THE IDLE SPEED TO PROPER SETTING (PROPER SPEED IS APPROXIMATELY 2,600 RPM OR FASTEST IDLE AT WHICH THE CHAIN WILL NOT ROTATE). CAUTION!! ANY TIME THE IDLE SPEED SCREW IS CHANGED, READJUST THE LO NEEDLE FOR PROPER MIXTURE.	
	4. HI SPEED MIXTURE SCREW.	
	A. SET THE HI SPEED MIXTURE SCREW SO THE ENGINE IS RUNNING SLIGHTLY RICH AT A HIGH RPM.	
	B. HOLD THE THROTTLE WIDE OPEN WHILE MAKING A CUT.	SL II - 4
	C. TURN ENGINE HI NEEDLE CLOCKWISE UNTIL THE ENGINE FALTERS.	
	D. NEXT TURN HI NEEDLE COUNTER-CLOCK-WISE ONE-FOURTH TURN (OR TO WHERE ENGINE CARRIED A FULL LOAD).	
	V. IGNITION MAINTENANCE	
	FAILURE OF THE ENGINE TO START MAY BE DUE TO A WET, FOULED, OR OTHERWISE FAULTY SPARK PLUG. STEPS FOR CHANGING AND CHECKING THE PLUG ARE AS FOLLOWS.	
	A. STEPS FOR CHANGING SPARK PLUGS.	
	1. PULL OFF RUBBER BOOT AND REMOVE SPARK PLUG.	
	2. CHECK THE PLUG.	SL II - 5
	A. A WET PLUG INDICATES A FLOODED ENGINE DUE TO FAULTY FUEL OR SPARK PLUG BREAKDOWN.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	B. AN OILY PLUG INDICATES A DIRTY AIR FILTER, TOO MUCH OIL IN THE GAS, OR A TOO-RICH MIXTURE ON CARBURETOR JET.	
	3. THE PLUG, IF FIRING ALL RIGHT, SHOULD BE CLEANED AND THE GAP ADJUSTED TO .025. IN THE FIELD, A ROUGH .025 SETTING IS APPROXIMATELY A FOLDED MATCH BOOK COVER.	
	4. CHECK FOR SPARK OR FIRING.	SL II - 6
	A. INSERT PLUG INTO PLUG WIRE.	
	B. GROUND THE PLUG TO THE SIDE OF THE ENGINE.	
	C. PULL STARTER CORD AND LOOK FOR THE SPARK JUMPING THE GAP.	
	D. IF THERE IS NOT A DISTINCT SHARP SPARK, THEN THE PLUG MAY BE FAULTY OR THE MAGNETO MAY BE FAULTY.	
	B. STEPS FOR CHECKING THE MAGNETO.	
	1. REMOVE THE RUBBER BOOT FROM THE SPARK PLUG AND INSERT A 1/4 INCH BOLT INTO THE HIGH TENSION LEAD.	
	2. HOLD THE BOLT 1/4 INCH AWAY FROM THE PLUG OR METAL SURFACE AND CRANK THE STARTER CORD.	
	A. A BROAD, BLUE SPARK OR A DISTINCTIVE SNAP MEANS THE MAGNETO IS WORKING PROPERLY.	
	B. IF NOT, ONLY A QUALIFIED MAINTENANCE MAN SHOULD SERVICE IT.	SL II - 7

TIME	OUTLINE	KEY POINTS AND AID CUES
	C. ON-OFF SWITCH. ANOTHER PROBLEM, ALTHOUGH NOT COMMON, THAT MAY ARISE IS THAT THE ON-OFF SWITCH COULD BE BAD OR THE GROUND WIRE COULD BE BROKEN INSIDE THE STARTER CORD HOUSING THAT ATTACHES TO THE SWITCH. IF EITHER MALFUNCTIONS, IT IS BEST TO REPLACE IT.	
	D. COMPRESSION RELEASE. THE COMPRESSION RELEASE IS A VERY IMPORTANT PART OF A LARGER, MORE POWERFUL CHAIN SAW. IT RELEASES PART OF THE COMPRESSION FROM THE ENGINE, THEREFORE ALLOWING THE OPERATOR TO START THE SAW EASIER. IF YOUR SAW HAS A COMPRESSION RELEASE, USE IT, BECAUSE YOU ARE LESS LIKELY TO DAMAGE THE STARTER ASSEMBLY. THE COMPRESSION RELEASE SHOULD BE CHECKED PERIODICALLY, OR DAMAGE TO THE ENGINE MAY OCCUR.	SL II - 8
	VI. STARTER CORD ASSEMBLY	SL II - 9
	IF THE STARTER CORD OR RETURN SPRING, SHOULD BREAK ON THE SAW, THE SAW BECOMES USELESS UNLESS IT IS REPAIRED.	
	A. THE STEPS FOR REPLACING THE CORD AND SPRING ARE SIMILAR AND ARE AS FOLLOWS:	
	1. REMOVE THE STARTER CORD HOUSING FROM THE CHAIN SAW BODY, MAKING SURE TO REMOVE THE GROUND WIRE THAT ATTACHES TO THE SWITCH.	
	2. REMOVE THE RETAINING SCREW FROM THE CENTER OF THE PULLEY.	
	3. PULL THE PULLEY FROM THE HOUSING. TAKING CARE NOT TO PULL THE SPRING OUT AT THE SAME TIME.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	4. REPLACE THE BROKEN ROPE IN THE PULLEY AND HANDLE AND INSERT BACK INTO THE HOUSING.	
	5. REWIND THE SPRING TENSION BY TURNING THE PULLEY CLOCKWISE FOUR FULL TURNS AND THEN FIXING THE ROPE TO THE HANDLE SO IT CANNOT UNWIND.	
	6. LOCK THE PULLEY IN PLACE WITH THE RETAINING SCREW AND ATTACH THE ASSEMBLY TO THE CHAIN SAW BY PRESSING THE HOUSING LIGHTLY AGAINST THE ROTOR WHILE PULLING THE STARTER CORD TO LET THE ASSEMBLY CLICK OR SEAT AGAINST THE ENGINE COVER.	
	TO REPLACE THE REWIND SPRING FOLLOW THE ABOVE STEPS EXCEPT YOU MUST REMOVE THE OLD SPRING AND INSERT A NEW ONE.	
	B. ADDING MORE SPRING TENSION IF THE ROPE DOES NOT REWIND ALL THE WAY.	SL II - 10 SL II - 11
	1. PULL OUT THE ROPE GRIP ABOUT ONE FOOT AND HOLD PULLEY FROM REWINDING.	
	2. TURN THE PULLEY TO LOCATE THE NOTCH AT THE CORD ENTRY HOLE IN THE HOUSING.	
	3. HOOK UP A LOOP OF CORD BETWEEN THE HOUSING AND THE PULLEY.	
	4. HOLD CORD LOOP AT THE NOTCH AND WIND PULLEY ONE TURN OF TENSION (MORE IF NECESSARY) IN A CLOCK-WISE DIRECTION.	
	5. HOLD PULLEY FROM TURNING AND PULL THE CORD BACK OUT THROUGH THE HOLE BEFORE LETTING THE PULLEY REWIND.	
	6. IF THE RECOIL STARTER IS A PART OF THE FAN HOUSING BE	

TIME	OUTLINE	KEY POINTS AND AID CUES
	SURE THE LUGS ON THE STARTER PULLEY ENGAGE THE PAWLS ON THE FLYWHEEL WHEN THE HOUSING IS REPLACED. POSITION THE HOUSING AND HOLD DOWN WITH ONE HAND. PULL THE STARTER CORD SLOWLY UNTIL THE HOUSING DROPS INTO PLACE THEN INSTALL AND TIGHTEN ALL HOLDING SCREWS.	
	CAUTION!! THE GRILL WORK OF THE FAN HOUSING MUST BE KEPT CLEAN TO ASSURE THAT COOLING AIR TO THE ENGINE IS NOT RESTRICTED.	
	VII. THE EXHAUST SYSTEM	
	A. CHECK THE MUFFLER AND EXHAUST PORTS FOR CARBON BUILDUP AND BE SURE THE SAW IS EQUIPPED WITH A SPARK ARRESTOR SCREEN THAT IS IN GOOD CONDITION. THIS IS A REQUIREMENT WHEN WORKING IN NATIONAL FORESTS DURING FIRE SEASON. OPENINGS IN THE SCREEN SHOULD NOT EXCEED .023 OF AN INCH AND THE SCREEN ITSELF SHOULD BE LARGE ENOUGH TO COMPLETELY COVER THE EXHAUST PORT PLUS SOME OVERLAP.	
	B. A GOOD WAY TO CHECK THE SPARK ARRESTOR SCREEN IS WITH A .025 INCH DIAMETER WIRE TYPE SPARK PLUG GAGE. IF THE GAGE WILL NOT PASS THROUGH THE SCREEN OPENINGS IT SHOULD BE ADEQUATE TO STOP THE ESCAPE OF HOT SPARKS. THE SCREEN SHOULD BE CHECKED AND THE EXHAUST PORTS CLEANED AT LEAST EVERY 25 HOURS OF OPERATION.	
	C. USE A BLUNT TOOL TO SCRAPE AWAY THE CARBON AND BE CAREFUL NOT TO DAMAGE THE EXHAUST CHAMBER OR SCREEN. TO REMOVE CARBON BUILT UP AROUND THE EXHAUST PORT HOLES	SL II - 12

TIME	OUTLINE	KEY POINTS AND AID CUES
	IN THE CYLINDER, FIRST TAKE OUT THE SPARK PLUG AND THEN CRANK THE ENGINE UNTIL THE PISTON IS AT THE BOTTOM OF THE STROKE. CAREFULLY SCRAPE THE CARBON FROM THE PORTS WITH A BLUNT TOOL OR WOOD SCRAPER SO THAT CARBON PARTICLES DO NOT FALL INTO THE CYLINDER. TURN THE SAW SO THE PORTS ARE DOWN AND SHAKE OUT THE LOOSE PARTICLES, THEN CRANK THE ENGINE SEVERAL TIMES TO BLOW OUT THE REMAINING PARTICLES. REPLACE THE SPARK PLUG AND MUFFLER AND BE SURE THE SPARK ARRESTOR SCREEN IS IN PLACE.	
	VIII. LUBRICATION COMPONENTS	
	A. WITHOUT PROPER LUBRICATION ANY PIECE OF EQUIPMENT WITH MOVING PARTS WILL BURN UP.	
	1. ENGINE LUBRICATION. THE ENGINE RECEIVES ITS LUBRICATION FROM THE OIL IN THE FUEL MIXTURE.	
	2. BAR AND CHAIN LUBRICATION. IF THE CHAIN BECOMES DRY AND THE BAR HOT, IT IS A GOOD INDICATION OF ONE OR A COMBINATION OF THREE THINGS. ONE IS THAT THE OIL RESERVOIR IS EMPTY, TWO THAT THE AUTOMATIC OR MANUAL OILER PUMP IS FAULTY, AND THREE, THAT THE OIL SLOT IS PLUGGED BY DUFF, DIRT AND WOOD CHIPS.	SL II - 13 CAUTION! ALWAYS CHECK OIL PUMP BEFORE USING THE SAW.

TIME	OUTLINE	KEY POINTS AND AID CUES
	A. FIRST, FILL THE BAR OIL RESERVOIR. ON SAWS WITH AUTOMATIC OILERS, IF THE OILER IS PROPERLY ADJUSTED, THERE SHOULD BE A SMALL AMOUNT OF OIL LEFT IN THE OIL RESERVOIR. IF IT IS DRY, YOUR CHAIN MAY BE RUNNING TOO HOT FROM IMPROPER LUBRICATION.	
	B. BEFORE RUNNING OUT OF GAS ON YOUR NEXT TANK, REFILL THE BAR OIL RESERVOIR. THIS ENSURES PROPER OILING. IF YOU HAVE A LARGE AMOUNT OF OIL LEFT IN THE RESERVOIR, YOUR OILING SLOTS MAY BE PLUGGED OR YOUR OILER IS ADJUSTED TOO LEAN.	
	C. TO CHECK WHETHER THE ADJUSTMENT IS TOO LEAN, DEPRESS THE MANUAL OILER BUTTON TWO OR THREE TIMES. IF IT WORKS PROPERLY, AND OIL APPEARS ON TOP OF THE BAR NEAR THE ENGINE, YOU WILL HAVE TO SUPPLEMENT THE AUTOMATIC OILER WITH AN OCCASIONAL EXTRA SQUIRT OF OIL.	SL II - 14
	D. IF YOU ARE UNABLE TO GET ANY OIL BY USING THE MANUAL OILER, REMOVE THE BAR AND CHAIN AND CLEAN THE OILING GROOVES IN THE BAR. AN INADEQUATE SUPPLY OF OIL TO THE CHAIN CAN GREATLY REDUCE BOTH THE EFFICIENCY OF YOUR CUTTING AND THE LIFE OF YOUR CHAIN, BAR, AND SPROCKET. CHECK YOUR OILER OFTEN WHILE USING THE SAW.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	E. IF COLD AND SNOWY CONDITIONS ARE ENCOUNTERED, USE OF A SPECIAL BAR AND CHAIN OIL MAY BE NECESSARY INSTEAD OF THE GOOD QUALITY SAE 20 OR 30 MOTOR OIL. THIS OIL IS FORMULATED TO FLOW FREELY IN COLD WEATHER AND YET CLING TO THE BAR AND CHAIN INSTEAD OF BEING THROWN OFF OR WASHED AWAY BY SNOW.	
	3. IF OIL PUMP MAINTENANCE IS REQUIRED, THE ONLY THING TO DO IS SEND THE CHAINSAW BACK TO THE SHOP TO A QUALIFIED MECHANIC.	
	C. MOST SAWS IN THE GOVERNMENT WILL BE DIRECT DRIVE, BUT ON OCCASION YOU WILL RUN ACROSS A GEAR DRIVEN SAW. IF YOU DO, ALWAYS CHECK THE OIL LEVEL IN THE GEAR BOX.	
	1. HAVE THE SAW SITTING LEVEL AND REMOVE THE PLUG.	
	2. THE OIL LEVEL SHOULD REACH TO THE BOTTOM OF THE PLUG HOLE OR JUST RUN OUT.	
	3. IF LOW, ADD 90- OR 140-WT. GEAR OIL WHICHEVER IS RECOMMENDED.	
	4. REPLACE THE PLUG.	
	IX. GUIDE BAR MAINTENANCE	
	AFTER EXTENDED USE, THE GUIDE BAR AND THE OIL SLOTS CAN BECOME CLOGGED WITH DIRT AND WOOD CHIPS. TO CLEAN THE BAR REMOVE IT FROM THE SAW AFTER REMOVING THE CHAIN AND SCRAPE THE INSIDE CLEAN WITH A SMALL NAIL OR POCKET KNIFE OR	

TIME	OUTLINE	KEY POINTS AND AID CUES
	ANY OTHER HANDY GADGET. AFTER APPROXIMATELY 40 HOURS OF USE, REVERSE THE BAR SO THAT THE ENTRY AND EXIT CHANGE ROLES.	
	IF THE BAR HAS A SPROCKET OR ROLLER TIP LUBRICATE IT WITH A HIGH QUALITY GREASE EACH TIME YOU FUEL THE SAW.	
	TO REMOVE GUIDE BAR:	
	A. LOOSEN BAR NUTS.	
	B. ROTATE ADJUSTING SCREW TO LOOSEN CHAIN.	
	C. REMOVE BAR NUTS.	
	D. REMOVE DRIVE CASE COVER.	
	E. REMOVE OUTER PLATE.	
	F. REMOVE GUIDE BAR.	
	X. CHAIN MAINTENANCE	
	PROPER CARE GIVEN TO THE CHAIN IS ONE OF THE MOST DEMANDING AND TIME CONSUMING ITEMS FOR THE OPERATOR. UNLESS THE CHAIN IS TAKEN CARE OF PROPERLY THE OPERATOR MAY AS WELL NOT HAVE THE SAW. LISTED ARE SOME OF THE STEPS FOR GOOD CHAIN CARE.	
	A. CHAIN TENSION. THE TENSION OF THE CHAIN SHOULD BE KEPT ADJUSTED TO PREVENT EXCESSIVE WEAR.	SL II - 15
	1. HOLD UP TIP OF BAR DURING TENSION ADJUSTMENT AND UNTIL BAR NUTS HAVE BEEN SNUGGED. THIS PREVENTS SHIFT OF THE BAR ON ITS MOUNT.	CAUTION: IT'S BEST TO WEAR GLOVES.
	2. TURN ADJUSTING SCREW TO TAKE UP THE SLACK UNTIL CHAIN IS FULLY TIGHT, THEN BACK OFF THE TIGHTENER SCREW 1/8 TURN THEN TIGHTEN THE BAR NUTS AND SQUIRT THE CHAIN OILER THREE TIMES. YOU SHOULD THEN BE ABLE TO PULL THE CHAIN THROUGH BY HAND.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	CAUTION!! CHECK CHAIN TENSION ON A NEW CHAIN EVERY FEW CUTS DURING THE FIRST HALF HOUR OF OPERATION. THE CHAIN TENDS TO STRETCH AND NEEDS ADJUSTMENT.	
	3. THE CHAIN SHOULD NEVER EXTEND BELOW THE BAR. THE TENSION OF THE CHAIN ON A ROLLER TIP OR SPROCKET TIP BAR SHOULD BE TIGHTER THAN ON A CONVENTIONAL TIP.	SL II - 16
	B. SHARPENING THE CHAIN. THE CHAIN SHOULD BE KEPT SHARP TO INCREASE THE CUTTING LOAD AND MINIMIZE CHAIN WEAR.	SL II - 17
	1. DIMENSIONS AND ANGLES VARY FOR VARIOUS BRANDS AND TYPES OF CHAINS BUT GENERALLY THE CUTTERS ARE FILED IN THIS MANNER. LOOKING FROM THE TOP, THE CUTTER SHOULD BE ANGLED BACK AT AN ANGLE OF 30 DEGREES FOR CHISEL CHAIN AND 35 DEGREES FOR SEMI-CHISEL CHAIN AND CHIPPER CHAIN.	
	2. THERE ARE SEVERAL TYPES OF INEXPENSIVE FILE HOLDERS THAT ARE MARKED WITH THE PROPER FILING ANGLE AND ALSO CONTROL THE DEPTH OF THE FILE IN THE GULLET OF THE CUTTER.	
	3. HOLD THE BAR SO IT WILL NOT MOVE WHEN THE FILING STROKE IS MADE. FILE ALL OF THE CUTTERS ON ONE SIDE OF THE CHAIN FIRST. THIS HELPS TO HOLD THE PROPER ANGLE. WITH A NORMAL FILING TWO OR THREE LIGHT STROKES WILL BE ADEQUATE. EACH CUTTER SHOULD BE FILED THE SAME AMOUNT SO THEY WILL ALL REMAIN NEARLY THE SAME LENGTH. THIS IS ONE OF THE MOST DIFFICULT PARTS OF CHAIN FILING AS MOST PEOPLE FIND IT EASIER TO FILE IN ONE DIRECTION AND END UP WITH THE CUTTERS	SHARPEN FROM THE INSIDE TOWARD THE OUTSIDE OF THE CUTTER.

TIME	OUTLINE	KEY POINTS AND AID CUES
	LONGER ON ONE SIDE OF THE CHAIN. IF ONE OR MORE OF THE CUTTERS HAVE RECEIVED DAMAGE THAT MUST BE FILED OUT THEN ALL OF THE CUTTERS MUST BE FILED BACK THE SAME AMOUNT.	
	4. THERE ARE OTHER, MORE SOPHISTICATED FILING GUIDES AVAILABLE THAT TAKE ALL OF THE GUESSWORK OUT OF CHAIN SHARPENING. THE FILING ANGLES CAN BE SET PRECISELY TO THE MANUFACTURER'S RECOMMENDATIONS AND EACH CUTTER WILL BE FILED TO THE SAME LENGTH. IT IS A GOOD PRACTICE FOR EVEN AN EXPERIENCED SAW FILER TO USE THIS TYPE OF AID OCCASIONALLY TO ASSURE THE CUTTERS ARE ALL EVEN.	SL II - 18
	STEPS FOR SHARPENING ARE:	
	1. HOLD THE FILE HOLDER FLUSH AGAINST THE TOP PLATE ON THE TOOTH SO THE FILE IS PARALLEL TO THE TOP PLATE. FILE FROM THE INSIDE OUT.	10^{o} ANGLE FOR CHISEL CHAIN
	2. USE LIGHT, BUT FIRM, PRESSURE ON THE FILE. THE FILE HOLDER WILL KEEP 10% OF THE FILE DIAMETER ABOVE THE TOOTH TO ALLEVIATE ANY HOOK IN THE TOOTH.	
	3. KEEP THE FILE LEVEL. LINE UP THE GUIDE MARK ON THE HOLDER WITH THE CENTER LINE OF THE CHAIN.	10^{o} ANGLE FOR CHISEL CHAIN
	4. FILE TEETH WITH A FEW FIRM STROKES. DO NOT LET THE FILE DIP OR ROCK.	OCCASIONALLY ROTATE FILE IN FILE HOLDER.
	CAUTION!! ALWAYS MATCH THE CORRECT SIZE FILE WITH THE CHAIN ON THE SAW. DO NOT DRAG THE FILE BACK ACROSS THE CUTTER.	

TIME	OUTLINE	KEY POINTS AND AID CUES

5. TO HELP KEEP THE SAW CHAIN SHARP ALWAYS USE A SCABBARD WHEN TRANSPORTING THE SAW AND NEVER WITH OTHER LOOSE TOOLS.
6. THE NEXT STEP TO AID IN KEEPING THE CHAIN SHARP IS TO CHECK OVER THE AREA WHERE THE CUT IS TO BE MADE AND CLEAN AWAY ANY DIRT, GRAVEL OR FOREIGN MATERIAL. THE BAR TIP MUST NOT TOUCH THE GROUND AS THE CUT IS MADE.

C. SETTING THE DEPTH GAUGE CLEARANCE. EVERY THIRD OR FOURTH TIME THE CUTTERS ARE SHARPENED, THE DEPTH GAUGES, CALLED "RAKERS" SHOULD BE FILED.

1. ATTACH DEPTH GAUGE JIG ON THE CHAIN AND USE A FLAT FILE TO KNOCK OFF THE TIPS.
2. AFTER FILING, ROUND OFF THE SHARP SQUARE CORNER ABOUT ONE-THIRD TO FACILITATE SMOOTH ENTRY INTO THE CUT. CAUTION!! PROPPER SETTING OF THE DEPTH GAGES IS VERY IMPORTANT TO ACHIEVING THE CUTTING CAPABILITIES DESIGNED INTO A SAW CHAIN. THE DEPTH GAGE CONTROLS THE BITE THE CUTTER TAKES AND MUST BE SET ACCURATELY TO MAINTAIN THE SELF-FEEDING CHARACTERISTICS OF THE CHAIN. IF THE DEPTH GAGES ARE TOO HIGH, THE CHAIN CUTS SLOWLY AND SAWYER APPLIES MORE PRESSURE. THE PRESSURE INCREASES FRICTION WHICH WEARS THE CHAIN TIE STRAPS AND BAR. WHEN THE DEPTH GAGES ARE TOO LOW, THE CUTTER GOUGES INTO THE WOOD AND POUNDS THE HEEL OF THE CUTTER. THE DEPTH SETTING IS USUALLY .025 TO .035 FOR MOST CUTTING.

TIME	OUTLINE	KEY POINTS AND AID CUES
	XI. PREVENTIVE MAINTENANCE THE MOST IMPORTANT ASPECT OF KEEPING ANY PIECE OF EQUIPMENT OPERATING PROPERLY IS THE TIME TAKEN TO LOOK FOR FAULTS BEFORE THEY HAPPEN. ALWAYS TAKE THE TIME TO CLEAN THE SAW AFTER USING IT AND AT THE SAME TIME LOOK FOR THAT LOOSE SCREW OR BOLT THAT MIGHT LATER CAUSE A PROBLEM. USE PROPER TOOLS TO TIGHTEN--BUT DO NOT OVERTIGHTEN OR THREADS CAN BE DAMAGED AND THE CASING CRACKED OR BROKEN. IF YOU TREAT A CHAIN SAW PROPERLY IT WILL GIVE YOU MANY HOURS OF TROUBLE-FREE SERVICE. A. DAILY INSPECTION. 1. CHAIN SHOULD BE INSPECTED FOR CORRECT TENSION, SHARPNESS, AND PROPER DEPTH GAUGE SETTINGS. 2. INSPECT BAR FOR CRACKS, WORN SPOTS, BURRS, AND STRAIGHTNESS: CLEAN IF NECESSARY. 3. CHECK AIR FILTER TO SEE IF IT IS CLEAN AND CORRECTLY INSTALLED. 4. INSPECT FUEL FILTER SCREEN OR PAD. 5. EXAMINE AND CLEAN EXTERIOR OF SAW. 6. CHECK SPROCKET FOR WORN TEETH OR GROOVES. REPLACE WHEN INSTALLING NEW CHAIN. 7. CHECK FOR TIGHT MUFFLER BOLTS AND TO SEE IF MUFFLER IS IN GOOD WORKING ORDER. 8. CHECK RECOIL STARTER AND ROPE FOR PROPER TENSION AND WEAR. 9. CHECK GEAR CASE OIL LEVEL ON GEAR DRIVEN SAWS. 10. CHECK CHAIN OILER FOR PROPER OIL DISPERSEMENT; FILL OIL RESERVOIR.	SL II - 19

TIME	OUTLINE	KEY POINTS AND AID CUES

11. TIGHTEN ALL NUTS, BOLTS, AND SCREWS.

12. CLEAN COOLING FINS AND FAN HOUSING.

13. WITH SAW RUNNING, CHECK CARBURETOR ADJUSTMENTS.

B. PERIODIC MAINTENANCE. WILL NORMALLY FOLLOW THE SAME PROCEDURES THAT DAILY MAINTENANCE REQUIRES.

1. REMEMBER THAT THE BAR MUST BE ROTATED EVERY 40 HOURS TO ENSURE A LONG, BALANCED LIFE.

A. SMOOTH OFF ROUGH EDGES.

B. CLEAN BAR GROOVE AND MOUNTING PAD.

2. THE COMPLETE SAW SHOULD BE THOROUGHLY CLEANED AFTER EXTENSIVE USE TO PREVENT OILY DIRT BUILDUP THAT CAUSES OVERHEATING AND EXCESSIVE WEAR.

3. STORAGE. THE SAW MUST BE PROTECTED AGAINST CHEMICALS AND MOISTURE IN THE ATMOSPHERE DEPENDING UPON YOUR LOCAL AREA. THE FOLLOWING ARE A FEW STEPS TO HELP GUARD YOUR SAW AGAINST THE ELEMENTS:

A. RUN ENGINE FOR 30 SECONDS AT IDLE SPEED WITH CHOKE CLOSED. THIS PUTS A COATING OF OIL AND GAS ON THE INTERNAL PARTS.

B. DRAIN ALL FUEL FROM TANK AND CARBURETOR. THIS WILL PREVENT GUM AND GLUE FROM ACCUMULATING. IF THE SAW IS NOT GOING TO BE USED FOR 30 DAYS OR MORE.

C. REMOVE SPARK PLUG AND PUT A SMALL AMOUNT OF OIL IN CYLINDER. TURN ENGINE OVER A COUPLE OF TIMES TO DISTRIVUTE THE OIL: REPLACE PLUG.

TIME	OUTLINE	KEY POINTS AND AID CUES
	D. REMOVE THE CHAIN AND BAR. SOAK THE CHAIN IN OIL AND OIL THE BAR AND GROOVE. STORE CHAIN IN OILED PAPER OR IMMERSED IN OIL.	
	E. COVER SAW AND STORE IN COOL, DRY PLACE. IF SAW IS STORED FOR A LONG PERIOD, THE ENGINE SHOULD BE TURNED OVER ONCE A MONTH TO REDISTRIBUTE THE OIL.	
	XII. SUMMARY	
	A. QUESTIONS AND ANSWERS.	
	B. REVIEW UNIT OBJECTIVES.	

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B)
TYPE : LECTURE & DISCUSSION

UNIT : III BASIC CHAIN SAW OPERATIONS
REFERENCES : DOUGLAS DENT FILMS
PROFESSIONAL TIMBER FALLING
FALLERS AND BUCKERS HANDBOOK
HEALTH & SAFETY CODE, FSH 6109.13

TIME : 3/4 HOUR
TRAINING AIDS: FILM PROJECTOR, DOUGLAS DENT FILMS #2, #3, EASEL PAPER

OBJECTIVES: UPON COMPLETION OF THIS UNIT, THE TRAINEE WILL BE ABLE TO:

1. LIST EIGHT SAFETY ITEMS THAT THE OPERATOR SHOULD WEAR FOR ANY FIELD CHAIN SAW OPERATION.
2. DESCRIBE SAFE PROCEDURES FOR FUELING THE CHAIN SAW.
3. DESCRIBE THE PROPER PROCEDURE FOR STARTING A CHAIN SAW.
4. DESCRIBE SAFE STANCE AND HANDLING OF A CHAIN SAW.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. UNIT OBJECTIVES	
	II. SAFETY EQUIPMENT	DOUGLAS DENT FILM #2
	A. CHAPS	
	B. HARD HAT	
	C. GLOVES	
	D. LONG SLEEVED SHIRT	
	E. LOOSE FITTING PANTS, NO CUFFS	
	F. NON SKID BOOTS	
	G. PROTECTIVE EYE GLASSES	
	H. EAR PLUGS	
	III. FUELING THE CHAIN SAW	

TIME	OUTLINE	KEY POINTS AND AID CUES

A. SHUT OFF THE SAW IF IT IS HOT AND ALLOW IT TO COOL APPROXIMATELY 5 MINUTES PRIOR TO REFILLING.

B. PLACE THE SAW WITH THE BAR POINTING DOWNHILL ON BARE GROUND, FREE FROM GRASS, TWIGS AND OTHER FLAMMABLE OBJECTS.

C. USE A FUNNEL OR FLEXIBLE HOSE AND APPROVED SAFETY CAN WITH SPOUT TO AVOID SPILLAGE. DO NOT FILL THE TANK FULL TO THE BRIM.

D. CLEAN ANY SPILLED OIL OR GAS FROM THE SAW BEFORE STARTING THE ENGINE.

E. DO NOT START THE ENGINE AT THE PLACE OF REFUELING, MOVE AT LEAST 10 FEET AWAY.

F. DO NOT WAIT FOR THE ENGINE TO RUN OUT OF GAS BEFORE REFUELING. REMOVAL OF THE SAW FROM SOME CUTS MAY BE DIFFICULT AND DANGEROUS, AND FILLING A TILTED SAW MAY CAUSE SPILLAGE.

G. CHECK THE FUEL LINES AND CONNECTIONS FOR LEAKS.

H. KEEP A FIRE EXTINGUISHED NEARBY WHEN FUELING AND OPERATING THE SAW.

IV. STARTING THE CHAIN SAW

A. BE SURE YOU HAVE FIRM FOOTING AND BALANCE WHEN STARTING THE SAW.

B. PLACE THE SAW ON THE GROUND OR OTHER FIRM SURFACE. MAKE SURE THE BAR AND CHAIN DO NOT REST ON OR TOUCH ANYTHING. IF PLACED ON A LOG OR STUMP, LOWER THE DOGS INTO THE WOOD FOR BETTER STABILITY AND CONTROL.

TIME	OUTLINE	KEY POINTS AND AID CUES
	C. TURN ON THE IGNITION SWITCH.	
	D. PULL THE CHOKE WHEN STARTING A COLD SAW.	
	E. PUSH IN THE COMPRESSION RELEASE.	
	F. GRASP THE SAW FIRMLY.	
	G. PULL THE STARTER CORD OUT SLOWLY UNTIL THE STARTER COGS ENGAGE THEN PULL QUICKLY AND EVENLY ON THE STARTER CORD. PULL THE STARTER ROPE IN SHORT PULLS SO YOU DO NOT PULL THE ROPE ALL THE WAY OUT.	
	H. AFTER THE SAW STARTS, GUIDE THE STARTER CORD BACK INTO THE REEL. DO NOT LET IT SNAP BACK OR THE STARTER ASSEMBLY MAY BE DAMAGED.	
	I. PUSH IN THE CHOKE. THIS MAY NEED TO BE DONE EARLIER TO PREVENT THE SAW FROM FLOODING.	
	J. DO NOT GUN THE ENGINE TO HIGH SPEEDS DURING WARMUP. THIS IS ALSO A GOOD TIME TO PUMP A LITTLE OIL ON THE CHAIN AND CHECK THE MANUAL AND AUTOMATIC OILER TO INSURE THEY ARE WORKING PROPERLY.	
	V. SAFE STANCE AND HANDLING	DOUGLAS DENT FILM #3
	VI. SUMMARY	
	A. QUESTIONS AND ANSWERS.	
	B. REVIEW UNIT OBJECTIVES.	

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B)

TYPE : LECTURE AND DISCUSSION

UNIT : IV CHAIN SAW FIELD PRACTICES

REFERENCES : PROFESSIONAL TIMBER FALLING FALLERS AND BUCKERS HANDBOOK HEALTH AND SAFETY CODE, FSH 6109.13

TIME : 2 HOURS

TRAINING AIDS: 16 MM FILM PROJECTOR, OR SLIDE/TAPE PLAYER, SCREEN, SLIDE TAPE SL IV 1 THRU 117 OR DOUGLAS DENT FILMS #4, #5, #8, #10, EASEL PAPER

OBJECTIVES: LISTED UNDER II IN THE OUTLINE

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THIS UNIT IS TO ACQUAINT THE TRAINEE WITH THE SAFETY PRACTICES AND CORRECT METHODS FOR LIMBING, BUCKING AND FELLING A TREE OR SNAG. II. UNIT OBJECTIVES UPON COMPLETION OF THIS UNIT YOU WILL BE ABLE TO: A. LIST THREE SAFETY PRACTICES TO BE USED IN LIMBING A DOWNED TREE. B. DESCRIBE THE SAFE PROCEDURE FOR LIMBING A STANDING TREE. C. ILLUSTRATE THE PROPER CUTS FOR BUCKING LOGS THAT ARE UNDER TENSION AND COMPRESSION. D. LIST FIVE SAFETY PRACTICES TO FOLLOW WHEN BUCKING A DOWNED TREE OR SNAG.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	E. LIST 10 ITEMS THE OPERATOR MUST SIZEUP BEFORE FELLING A TREE OR SNAG.	
	F. ILLUSTRATE THE PLACEMENT, SIZE, AND ANGLE OF THE UNDERCUT.	
	G. GIVE THREE REASONS FOR AN UNDERCUT.	
	H. ILLUSTRATE THE PLACEMENT, ANGLE, AND DEPTH OF THE BACKCUT.	
	I. DESCRIBE THE HINGE AND HOW IT IS USED TO CONTROL THE FALL OF A TREE OR SNAG.	
	J. LIST TWO REASONS FOR USING A WEDGE WHEN FELLING A TREE OR SNAG.	
	K. DESCRIBE THREE SITUATIONS THAT COULD RESULT IN CHAIN SAW KICKBACK.	
	NOTE: STOP THE PROGRAM AT ANY TIME TO ANSWER A QUESTION. DO NOT GO ON UNTIL EACH TRAINEE UNDERSTANDS THE METHODS EXPLAINED. IF NECESSARY, RUN THE SLIDE-TAPE OR FILM A SECOND TIME FOR REVIEW AND STRESS THAT ALL OF THE INFORMATION PRESENTED WILL BE DEMONSTRATED IN THE FIELD.	
	III. LIMBING	
	A. SHOW THE SLIDE-TAPE PROGRAM OR DOUGLAS DENT FILM.	SLIDE-TAPE SL IV 1-17 OR DOUGLAS DENT FILM #4
	B. DISCUSS ANY QUESTION RAISED BY THE TRAINEES ON LIMBING.	
	IV. BUCKING	
	A. SHOW THE SLIDE-TAPE PROGRAM OR DOUGLAS DENT FILM.	SLIDE-TAPE SL IV 18-41 OR DOUGLAS DENT FILM #5
	B. DISCUSS ANY QUESTIONS RAISED BY THE TRAINEES ON BUCKING.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	V. FELLING	
	A. SHOW THE SLIDE-TAPE PROGRAM OR DOUGLAS DENT FILM.	SLIDE-TAPE SL IV 42-117 OR DOUGLAS DENT FILMS #8, #10
	B. DISCUSS THE DIFFERENCE BETWEEN A CONVENTIONAL UNDERCUT AND A HUMBOLT UNDERCUT. EXPLAIN THE ADVANTAGES AND DISADVANTAGES OF EACH.	
	1. CONVENTIONAL UNDERCUT.	
	A. ALLOWS THE FALLER TO UTILIZE MORE OF THE TREE THAN THE HUMBOLT UNDERCUT.	
	B. MINIMIZES BREAKAGE WHEN FALLING BECAUSE LOWER STUMPS ARE LEFT.	
	2. HUMBOLT UNDERCUT.	
	A. MAY SERVE AS A ANTI-KICKBACK SAFETY VALVE.	
	B. MINIMIZES BREAKAGE ON UNEVEN TERRAIN.	
	C. DISCUSS ANY QUESTIONS RAISED BY THE TRAINEES ON FELLING.	
	VI. KICKBACKS	
	A. CAUSES OF KICKBACKS.	
	1. LOOSE CHAIN.	
	2. REINSERTION OF A MOVING CHAIN INTO A PREVIOUSLY BEGUN CUT.	
	3. WHEN THE BAR NOSE COMES INTO CONTACT WITH AN OBJECT SUCH AS ANOTHER LOG OR LIMB.	
	VII. SUMMARY	
	A. QUESTIONS AND ANSWERS.	
	B. REVIEW UNIT OBJECTIVES.	

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B)

TYPE : PRACTICAL EXERCISE

UNIT : V MAINTENANCE PRACTICAL APPLICATION

REFERENCES : CHAIN SAW MANUFACTURER'S MAINTENANCE MANUALS

TIME : 1 HOUR

TRAINING AIDS: CHAIN SAWS WITH ACCESSORIES, GREASE RAGS

OBJECTIVES: UPON COMPLETION OF THIS UNIT THE TRAINEE WILL BE ABLE TO PERFORM REQUIRED FIELD MAINTENANCE ON A CHAIN SAW TO MAKE IT OPERATIONAL.

TIME	OUTLINE	KEY POINTS AND AID CUES
	GIVEN A CHAIN SAW EACH GROUP IS TO PERFORM THE NECESSARY MAINTENANCE ON THE SAW TO MAKE IT OPERATIONAL. THIS SAW SHOULD BE THE SAME ONE THE GROUP USES DURING THE FIELD EXERCISES. SUGGESTED MAINTENANCE FOR TRAINEES TO PERFORM. (INSTRUCTOR MAY WANT TO FIX THE CHAIN SAWS SO ONE OR MORE OF THE FOLLOWING ITEMS REQUIRE MAINTENANCE BEFORE THE CHAIN SAW IS OPERATIONAL.) 1. ADJUST STARTER CORD SPRING ACTION. 2. ADJUST TENSION OF THE CHAIN. 3. SHARPEN CHAIN. 4. CLEAN AIR FILTER 5. GREASE-IF REQUIRED. 6. CHECK FUEL FILTER.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	7. CHECK SPARK PLUG FOR PROPER GAP AND FOR FIRING.	
	8. CHECK OILER.	
	9. CHECK ALL NUTS, BOLTS, AND SCREWS.	
	10. ADJUST CARBURETOR.	

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212B) TYPE : EXAMINATIONS

UNIT : FINAL EXAMINATIONS REFERENCES :

TIME : VARIABLE WITH EACH TRAINEE TRAINING AIDS: FIRST-AID KIT, CHAIN SAWS WITH ACCESSORIES, FIELD EXAMINATION CHECK LISTS, FIELD EXAMINATION SCORE SHEETS, WRITTEN EXAMINATIONS

OBJECTIVES:

UPON COMPLETION OF THIS UNIT THE TRAINEE WILL QUALIFY AS A TRAINEE FALLER QUALIFIED TO FELL AND BUCK MATERIALS UNDER 24 INCHES DBH.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. PURPOSE THE PURPOSE OF THE FINAL FIELD AND WRITTEN EXAMINATIONS ARE TO INSURE THAT EACH TRAINEE HAS MET THE COURSE OBJECTIVES WHICH QUALIFIES THE TRAINEE TO FELL AND BUCK MATERIALS UNDER 24 INCHES DBH. II. FIELD EXAMINATION FOR THE FIELD EXAMINATION THE INSTRUCTORS WILL USE THE FIELD EXAMINATION CHECK SHEETS TO INSURE THE PASSING CRITERIS IS MET AND RECORD PERFORMANCE ON THE FIELD EXAMINATION SCORE SHEETS. THE NUMBER OF TREES EACH TRAINEE WILL BE REQUIRED TO LIMB, BUCK AND FELL WILL BE DETERMINED BY THE INSTRUCTOR. INSTRUCTORS SHOULD MEET AND DISCUSS THE FIELD EXAMINATIONS TO INSURE CONTINUITY AMONG GRADING PROCEDURE.	FIELD EXAMINATION CHECK SHEETS. FIELD EXAMINATION SCORE SHEETS

TIME	OUTLINE	KEY POINTS AND AID CUES
	III. WRITTEN EXAMINATION A. A TRAINEE MUST PASS THE WRITTEN EXAM WITH A SCORE OF AT LEAST 70% CORRECT.	

VIEW GRAPHS

POWER PLANT

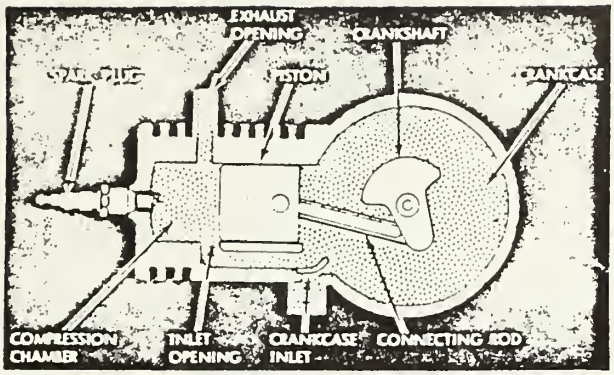


FIGURE 1

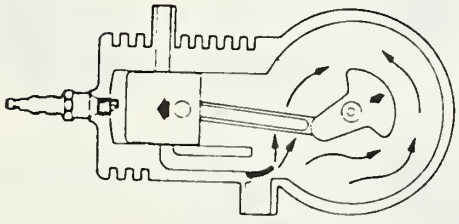


FIGURE 2

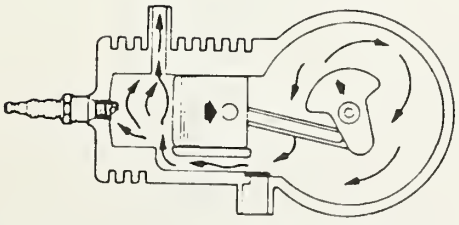
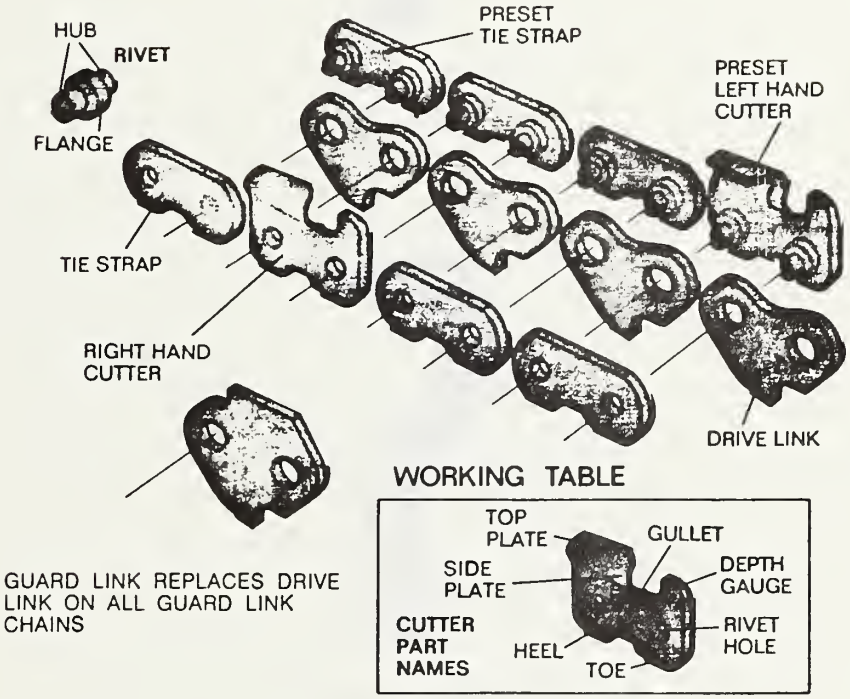


FIGURE 3

SAW CHAIN
PARTS



GUARD LINK REPLACES DRIVE LINK ON ALL GUARD LINK CHAINS

WORKING TABLE

SAW CHAIN TYPES

CHIPPER

SEMI CHISEL

CHISEL

FIELD EXAMINATION SCORE SHEET

FIELD EXAMINATION CHECK LIST

NAME_____

FIELD EXAMINATION SCORE SHEET

S - SATISFACTORY U - UNSATISFACTORY

COMMENTS SHOULD BE WRITTEN FOR ALL UNSATISFACTORY MARKS.

PROCEDURES	TREES									
	#1		#2		#3		#4		#5	
	S	U	S	U	S	U	S	U	S	U
I. LIMBING AND BUCKING										
A. SIZE UP										
B. BUCKING										
C. LIMBING										
D. SAFE HANDLING										
II. FELLING A TREE										
A. SIZE UP										
B. PREPARING THE AREA										
C. FELLING THE TREE										
D. SAFE HANDLING										

COMMENTS:

CHAIN SAW TRAINING (WW-212B)

FIELD EXAMINATION CHECK SHEET

LIMBING A STANDING TREE

PERFORMANCE ITEMS	PASSING CRITERIA
PHASE I. SIZEUP (ORAL BY EMPLOYEE). 1. CHECK TERRAIN AND WORKING AREA, SLOP, ROLLING ROCKS, ETC. 2. IDENTIFY OVERHEAD HAZARDS. 3. CHECK FOR PEOPLE AND EQUIPMENT IN WORKING AREA. 4. PLAN ESCAPE ROUTES.	EMPLOYEE MUST PERFORM EACH ITEM BEFORE CONTINUING TO PHASE II.
PHASE II. LIMBING THE TREE. 1. HANDLES AND MAINTAINS SAW IN SAFE AND PROPER MANNER*. 2. CLEARS WORKING AREA OF BRUSH, ETC. 3. USES PROPER SEQUENCE OF CUTS. 4. USES PROPER SAW OPERATION (OILING, ETC.) 5. RESULTS: ALL LIMBS MUST BE REMOVED CLOSE TO THE TREE TO HEAD HEIGHT.	EMPLOYEE MUST SATISFACTORILY PERFORM EACH ITEM ON ONE TREE. IF ITEMS ARE NOT SATISFACTORILY PERFORMED, HE MAY BE GIVEN A SECOND TREE.

CHAIN SAW TRAINING (WW-212B)

FIELD EXAMINATION CHECK SHEET

BUCKING A DOWNED TREE

PERFORMANCE ITEMS	PASSING CRITERIA
PHASE I. SIZEUP (ORAL BY EMPLOYEE). 1. CHECKS TERRAIN AND WORKING AREA AND NOTES SLOPE, ROCKS, ETC. 2. CHECKS FOR OVERHEAD HAZARDS IN SURROUNDING CANOPY. 3. CHECKS LOG POSITION FOR COMPRESSION AND TENSION. 4. CHECKS FOR PEOPLE AND EQUIPMENT IN SURROUNDING AREA. 5. SELECTS ESCAPE ROUTES IF NEEDED.	EMPLOYEE SIZEUP MUST BE COMPLETE AND ACCURATE ON AT LEAST TWO TREES. EMPLOYEE MAY BE GIVEN FIVE TREES FOR SIZEUP ONLY AND MUST PASS THIS PHASE BEFORE PROCEEDING TO PHASE II.

PERFORMANCE ITEMS	PASSING CRITERIA
PHASE II. BUCKING THE DOWNED TREE	EMPLOYEE WILL SATISFACTORILY BUCK TWO TREES INTO 2-FOOT LENGTHS THAT CAN BE SAFELY REMOVED AND DISPOSED OF BY HAND DEPENDING ON THE SIZE OF THE TREE.
1. HANDLES AND MAINTAINS SAW IN SAFE AND PROPER MANNER*	
2. CLEARS WORKING AREA OF BRUSH AND LIMBS SURROUNDING VEGETATION.	
3. LIMBS LOG TO BE BUCKED.	
4. USES PROPER SEQUENCE OF CUTS TO AVOID BINDING THE SAW.	
5. USES PROPER WEDGING AS NECESSARY.	
6. USES PROPER SAW OPERATION (OILING, ETC.)	
7. RESULTS:	
A. COMPLETES ALL CUTTING.	
B. CORRECTLY DISPOSES AND POSITIONS REMOVED LOG LENGTHS.	

CHAIN SAW TRAINING (WW-212B)

FIELD EXAMINATION CHECK SHEET

FELLING A TREE

PERFORMANCE ITEMS	PASSING CRITERIA
PHASE I. SIZEUP (ORAL BY EMPLOYEE). 1. CHECKS TERRAIN AND NOTES SLOPE, ROCK, DOWNED TIMBER, HAZARDS, ETC. 2. CHECKS AND DESCRIBES SOUNDNESS OF TREE (LOOSE BARK, TOP, ETC. 3. IDENTIFIES OVERHEAD HAZARDS IN CANOPY (WIDOW-MAKERS) 4. DETERMINES DIRECTION OF TREE LEAN. 5. OBSERVES CANOPY AND DISCUSSES HANGUP POTENTIAL OF FALLING TREE. 6. OBSERVES AND DESCRIBES WEATHER FACTORS OF WIND, PRECIPITATION, DEW ON GROUND, ETC. 7. IDENTIFIES PERSONNEL AND EQUIPMENT IN AREA. 8. MARKS WHERE TREE WILL FALL. 9. PLANS ESCAPE ROUTES, BOTH PRIMARY AND ALTERNATE.	EMPLOYEE SIZEUP MUST BE COMPLETE AND ACCURATE ON AT LEAST TWO TREES. HE MAY BE GIVEN A MAXIMUM OF FIVE TREES FOR SIZE-UP ONLY. HE MUST PASS THIS PHASE BEFORE PROCEEDING TO PHASE II.

PERFORMANCE ITEMS	PASSING CRITERIA
PHASE II. PREPARING THE AREA. 1. USES REQUIRED PERSONAL SAFETY GEAR. 2. HANDLES AND MAINTAINS SAW IN SAFE AND PROPER MANNER.* 3. CLEARS WORK AREA OF LITTER BRUSH, LIMBS, HAZARDS, ETC. 4. CLEARS BED FOR TREE AS NEEDED. 5. CLEARS ESCAPE ROUTES. 6. REMOVES UNNEEDED PERSONNEL AND EQUIPMENT FROM AREA. 7. APPOINTS AND INSTRUCTS SPOTTER.	EMPLOYEE PREPARATION FOR FALLING MUST BE COMPLETE AND ACCURATE BEFORE PROCEEDING TO PHASE III. SEE CRITERIA FOR ITEM 2. HE MAY BE GIVEN A SECOND TREE FOR PREPARATION IF HE DOES NOT PASS ON THE FIRST.

PERFORMANCE ITEMS	PASSING CRITERIA
PHASE III. FELLING THE TREE.	EMPLOYEE WILL SATISFACTORILY PERFORM ITEMS 1-5 BEFORE COMPLETING UNDERCUT. SEE CRITERIA FOR ITEM 2. IF ITEMS 6-10 ARE NOT SATISFACTORY, HE MAY BE GIVEN A SECOND TREE.
1. USES REQUIRED PERSONAL SAFETY GEAR.	
2. HANDLES AND MAINTAINS SAW IN SAFE AND PROPER MANNER.*	
3. CHECKS AND CLEARS AREA OF PERSONNEL AND EQUIPMENT.	
4. USES SPOTTER PROPERLY.	
5. MATCHES EQUIPMENT TO THE JOB.	
6. CALLS AUDIBLE WARNINGS AT PROPER TIMES.	
7. MAKES UNDERCUT TO PRODUCE DESIRED RESULTS.	
8. MAKES BACKCUT TO PRODUCE DESIRED RESULTS.	
9. USES PROPER WEDGING AS NEEDED.	
10. DEPARTS AREA IN SAFE MANNER.	
11. RESULTS ARE SATISFACTORY.	
A. TREE HITS MARK WITHIN $\pm$ 20°.	
B. TREE DOES NOT HANG UP IN CANOPY.	

PERFORMANCE ITEMS	PASSING CRITERIA
*SAFE HANDLING AND MAINTENANCE REQUIREMENTS FOR CHAIN SAW OPERATIONS.	
1. SAFETY EQUIPMENT IS AVAILABLE AND USED.	EMPLOYEE WILL
2. CHECKS EQUIPMENT CONDITION AND MAINTAINS.	FAIL WITH
3. USES SAFE FUELING PROCEDURES.	MORE THAN
4. USES SAFE STARTING PROCEDURES.	THREE VIOLA-
5. SAFE FOOTING AND SAW CONTROL EMPLOYED.	TIONS OF ANY
6. CUTTING SPEED IS UNDER CONTROL.	OF THESE.
7. AVOIDS TRAPS WHILE CUTTING.	
8. TRANSPORTS SAW SAFELY BY HAND.	
9. LEAVES FIRE EXTINGUISHER HANDY.	

TESTS

SCORE_____ NAME_____

CHAIN SAW TRAINING (WW-212B)

PRE-TEST

1. LIST TWENTY ONE PARTS OF THE CHAIN SAW AND DESCRIBE THE FUNCTION OF EACH. (21 PTS)

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15

16.

1. (CONTINUED)

17.

18.

19.

20.

21.

2. LIST 8 ITEMS ON THE CHAIN SAW THAT NEED TO BE INSPECTED OR MAINTAINED DAILY. (8 PTS)

1.

2.

3.

4.

5.

6.

7.

8.

3. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THEIR FUNCTION. (3 PTS)

1.

2.

3.

4. HOW OFTEN DO YOU CHANGE A FUEL FILTER? (2 PTS)

5. DESCRIBE THE PROCEDURE FOR CLEANING AN AIR FILTER. (3 PTS)

6. DESCRIBE THE PROCEDURE FOR ADJUSTING THE CHAIN TENSION. (3 PTS)

7. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)

   1. CHISEL CHAIN

   2. CHIPPER CHAIN

8. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)

9. WHAT IS THE BASIC FUEL-OIL MIXTURE FOR THE CHAIN SAW WHEN USING AN UNCONCENTRATED TWO-CYCLE OUTBOARD MOTOR OIL? (2 PTS)

10. DESCRIBE THE PROCEDURE FOR STARTING A CHAIN SAW. (4 PTS)

11. LIST EIGHT SAFETY ITEMS THAT THE OPERATOR SHOULD WEAR FOR ANY CUTTING OPERATION. (8 PTS)

1.

2.

3.

4.

5.

6.

7.

8.

12. LIST FIVE SAFETY FACTORS TO WATCH FOR WHEN BUCKING LOGS. (5 PTS)

1.

2.

3.

4.

5.

13. LIST TEN FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (10 PTS)

1.

2.

3.

4.

5.

13. (CONTINUED)

6.

7.

8.

9.

10.

14. ILLUSTRATE THE THREE CUTS FOR FELLING A TREE INDICATING THEIR ORDER AND SPECIFICATIONS. (6 PTS)

15. LIST THREE REASONS FOR USING AN UNDERCUT WHEN FELLING A TREE. (3 PTS)

1.

2.

3.

16. WHAT IS A HINGE AND WHAT IS ITS PURPOSE? (2 PTS)

17. LIST TWO REASONS FOR USING A WEDGE WHEN FELLING A TREE OR SNAG. (4 PTS)

1.

2.

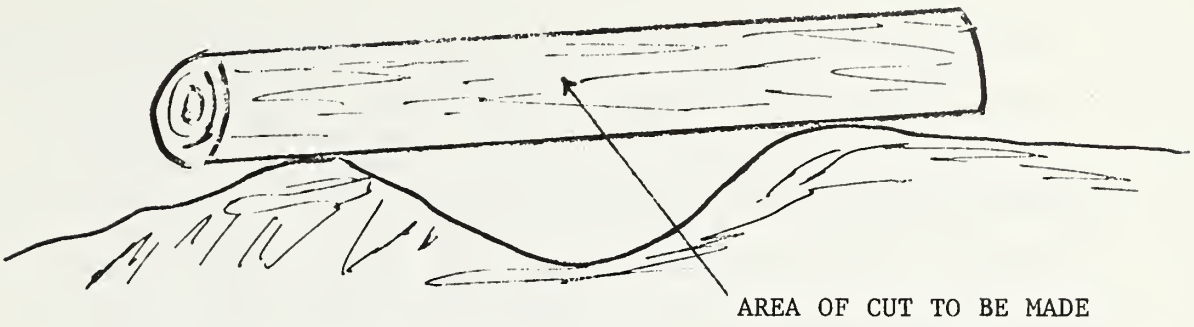
18. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (3 PTS)

1.

2.

3.

19. DESCRIBE THE TWO CUTS YOU WOULD MAKE WHEN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (4 PTS)



20. DRAW AN ARROW TO INDICATE THE DIRECTION OF FALL FOR THE DIAGRAM BELOW, ASSUMING IT IS A BALANCED TREE. (3 PTS)

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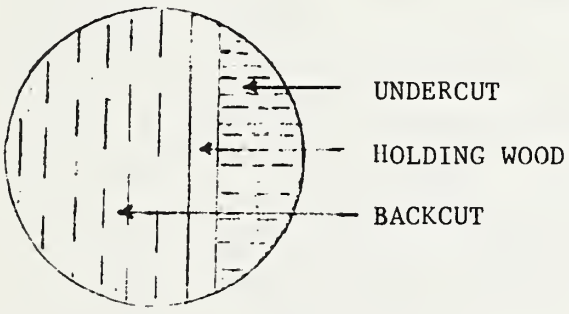
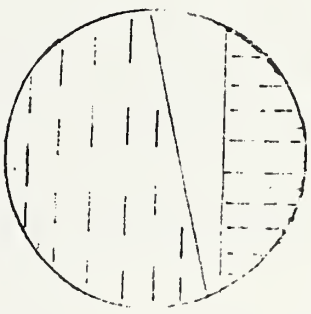




CHAIN SAW TRAINING (WW-212B)

PRE-TEST MASTER

1. LIST TWENTY ONE PARTS OF THE CHAIN SAW AND DESCRIBE THE FUNCTION OF EACH. (21 PTS)
   1. THROTTLE TRIGGER: REGULATES THE AMOUNT OF FUEL ENTERING THE ENGINE FOR COMBUSTION.
   2. THROTTLE LOCK: LOCKS THE THROTTLE TRIGGER OPEN FOR EASE OF STARTING.
   3. SPARK PLUG: IGNITES THE FUEL MIXTURE IN THE COMBUSTION CHAMBER.
   4. ON-OFF SWITCH: TURNS THE SAW ON OR OFF.
   5. CHOKE BUTTON: ALLOWS MORE FUEL TO BE DRAWN INTO THE CARBURETOR TO AID IN STARTING A COLD ENGINE.
   6. MANUAL OILER: PROVIDES A MEANS OF GETTING LUBRICATION TO THE BAR AND CHAIN.
   7. CHAIN OIL RESERVOIR FILLER HOLE: ALLOWS YOU TO FILL THE OIL RESERVOIR.
   8. MUFFLER: REDUCES ENGINE NOISE AND REDUCES ACCIDENTAL FIRE POTENTIAL FROM THE EXHAUST.
   9. CHAIN, CLUTCH, AND SPROCKET GUARD: A SAFETY DEVISE FOR PROTECTING THE OPERATOR AND ALSO TO DIRECT THE CHIPS DOWN AWAY FROM THE HOT EXHAUST ON SOME SAWS.
   10. CLUTCH AND SPROCKET ASSEMBLE: THE MECHANISM FOR ENGAGING THE POWER FROM THE ENGINE TO DRIVING THE CHAIN.
   11. CHAIN TENSION ADJUSTMENT SCREW: ALLOWS THE OPERATOR TO ADJUST THE TENSION OF THE CHAIN UPON THE GUIDE BAR TO ALLEVIATE EXCESSIVE WEAR.
   12. DOGS: ARE USED FOR SAW CONTROL WHILE FELLING AND BUCKING.
   13. STARTER CORD ASSEMBLY AND HOUSING: USED TO SPIN THE ENGINE SO THAT IT WILL START.
   14. AIR FILTER: FILTERS FOREIGN PARTICLES FROM THE AIR AND PROTECTS THE CARBURETOR INTAKES.
   15. CARBURETOR: MIXES THE FUEL WITH AIR TO PROVIDE THE CORRECT FUEL MIXTURE FOR COMBUSTION.
   16. HI AND LO CARBURETOR ADJUSTMENT SCREWS: THE LO ADJUSTMENT IS USED FOR SETTING LOW SPEED RPM AND HI ADJUSTMENT IS USED FOR SETTING HIGH SPEED OR PERFORMANCE RPM.
   17. IDLE SPEED SCREW: USED TO REGULATE THE RPM OF THE ENGINE AFTER THE CARBURETOR ADJUSTMENTS HAVE BEEN MADE.
   18. FUEL TANK: HOLDS THE FUEL MIXTURE.
   19. FUEL FILTER: FILTERS FOREIGN MATTER FROM THE FUEL TO PROTECT THE CARBURETOR JETS FROM CLOGGING.
   20. GUISE BAR: SERVES AS A GUIDE AND CHANNEL FOR THE CUTTING CHAIN TO RUN.
   21. CHAIN: THE PART OF THE CUTTING ATTACHMENT THAT CUTS THE WOOD.

2. LIST 8 ITEMS ON THE CHAIN SAW THAT NEED TO BE INSPECTED OR MAINTAINED DAILY. (8 PTS)
   1. CUTTERS.
   2. DEPTH GUAGES.
   3. BAR.
   4. STARTER ROPE ASSEMBLY.
   5. AIR CLEANER.
   6. GEAR LUBRICATION BOX.
   7. COOLING FINS.
   8. MUFFLER.
   9. HANDLEBAR NUTS AND BOLTS.
   10. GEAR OIL FOR GEAR DRIVEN SAWS.

3. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THEIR FUNCTIONS. (3 PTS)
   1. LOW SPEED ADJUSTMENT: MIXES THE FUEL AND AIR FOR STARTING AND LOW SPEED OPERATION.
   2. HIGH SPEED ADJUSTMENT: MIXES FUEL AND AIR FOR PEAK PERFORMANCE AND POWER.
   3. IDLE ADJUSTMENT: REGULATES THE SPEED OF THE ENGINE OR THE AMOUNT OF FUEL ENTERING THE COMBUSTION CHAMBER AT IDLE.

4. HOW OFTEN DO YOU CHANGE A FUEL FILTER? (2 PTS)
   WHENEVER IT'S NECESSARY OR DIRTY.

5. DESCRIBE THE PROCEDURE FOR CLEANING AN AIR FILTER. (3 PTS)
   1. REMOVE CARBURETOR HOUSING.
   2. BLOW OFF LARGE JUNKS OF DEBRIS.
   3. REMOVE AIR FILTER.
   4. TURN UPSIDE DOWN AND TAP LIGHTLY.
   5. WASH WITH STRAIGHT GASOLINE OR SOLVENT.
   6. BLOW DRY AND REPLACE.

6. DESCRIBE THE PROCEDURE FOR ADJUSTING THE CHAIN TENSION. (3 PTS)
   1. LOOSEN THE TWO MOUNTING NUTS ON THE CLUTCH-SPROCKET ASSEMBLY.
   2. EITHER LOOSEN OR TIGHTEN THE CHAIN BY TURNING THE ADJUSTMENT SCREW COUNTER-CLOCKWISE OR CLOCKWISE.
   3. TIGHTEN THE MOUNTING NUTS.

7. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)
   1. CHISEL CHAIN 30°
   2. CHIPPER CHAIN 35°

8. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)
   FROM THE INSIDE OF THE CUTTER TO THE OUTSIDE.

9. WHAT IS THE BASIC FUEL-OIL MIXTURE FOR THE CHAIN SAW WHEN USING AN UNCONCENTRATED TWO-CYCLE MOTOR OIL? (2 PTS)
   16:1

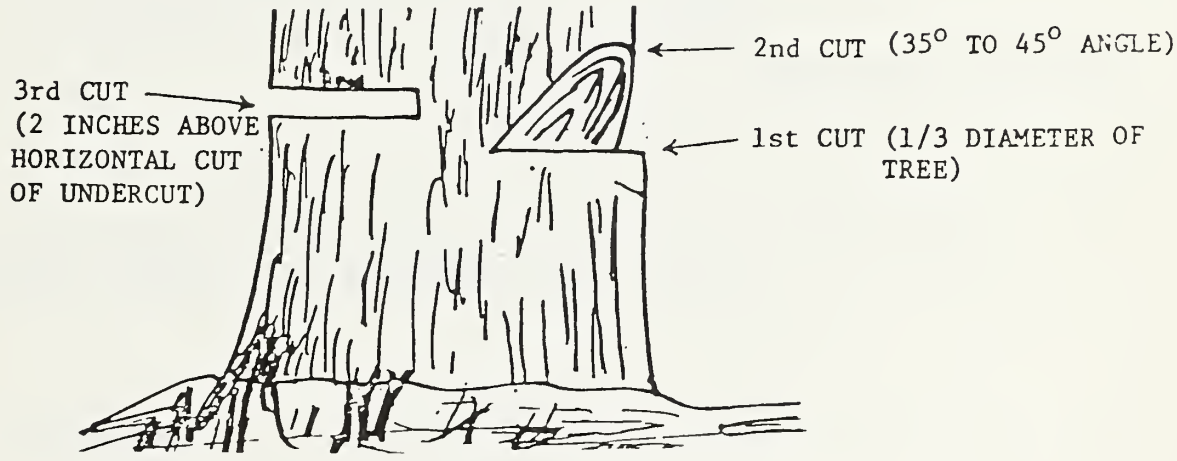
10. DESCRIBE THE PROCEDURE FOR STARTING A CHAIN SAW. (4 PTS)
    1. HAVE FIRM FOOTING AND BALANCE.
    2. PLACE THE SAW ON THE GROUND OR FIRM SURFACE, WITH BAR AND CHAIN CLEAR OF OBSTRUCTIONS.
    3. TURN ON THE IGNITION SWITCH.
    4. PULL THE CHOKE IF SAW IS COLD.
    5. PUSH IN THE COMPRESSION RELEASE.
    6. HAVE FIRM GRIP ON THE SAW.
    7. PULL STARTER CORD WITH SHORT, SHARP PULLS.
    8. GUIDE THE STARTER CORD BACK INTO THE STARTER CORD ASSEMBLY.
    9. PUSH IN THE CHOKE. THIS MAY NEED TO BE DONE EARLIER TO PREVENT THE SAW FROM FLOODING.

11. LIST EIGHT SAFETY ITEMS THAT THE OPERATOR SHOULD WEAR FOR ANY CUTTING OPERATION. (8 PTS)
    1. CHAPS.
    2. HARD HAT.
    3. GLOVES.
    4. LONG-SLEEVED SHIRT.
    5. LOOSE FITTING PANTS, NO CUFFS.
    6. NON SKID BOOTS.
    7. PROTECTIVE EYE GLASSES.
    8. EAR PLUGS.

12. LIST FIVE SAFETY FACTORS TO WATCH FOR WHEN BUCKING LOGS. (5 PTS)
    1. KICKBACK.
    2. PEOPLE IN THE CUTTING AREA.
    3. STAND UPHILL OF THE LOG.
    4. OTHER WORKERS BELOW THE LOG.
    5. SAW BINDS OR TRAPS.
    6. ALWAYS WEAR SAFETY ATTIRE.
    7. LIMBS UNDER COMPRESSION.
    8. CLEAR WORK AREA.
    9. FIRM FOOTING.
    10. FIRM GRIP ON THE SAW.
    11. STAND TO THE SIDE OF THE SAW.

13. LIST TEN FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (10 PTS)
    1. SPECIES; LIVE OR DEAD.
    2. SIZE; IS SAW LARGE ENOUGH FOR TREE?
    3. SOUNDNESS; ROTTEN, FORKED TOP, DEAD LIMB.
    4. DIRECTION OF LEAN; SLIGHT OR GREAT.
    5. HEAVY BRANCHES; LOPSIDED CROWN.
    6. WIND DIRECTION AND VELOCITY.
    7. NEARBY HAZARDS; TREES OR PEOPLE.
    8. SLOPE OF GROUND.
    9. ESCAPE ROUTE; CLEAR, AT RIGHT ANGLE TO FALL.
    10. SAFE WORKING AREA.

14. ILLUSTRATE THE THREE CUTS FOR FELLING A TREE INDICATING THEIR ORDER AND SPECIFICATIONS. (6 PTS)



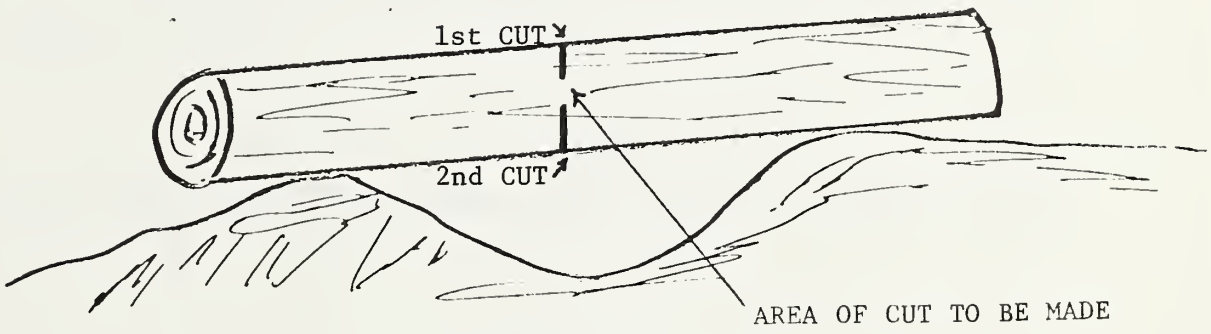
15. LIST THREE REASONS FOR USING AN UNDERCUT WHEN FELLING A TREE. (3 PTS)
    1. IT DIRECTS THE DIRECTION OF FALL.
    2. THE NOTCH RELIEVES SUPPORT OF THAT SIDE OF THE TREE.
    3. THE NOTCH IS AN EMPTY SPACE FOR THE TREE TO CLOSE, THUS AFFECTING A SMOOTH PIVOT OF THE TREE.
    4. IT ASSISTS IN PREVENTING A BARBER-CHAIR.
    5. CAN DETERMINE IF HEARTWOOD IS SOLID OR ROTTEN.

16. WHAT IS A HINGE AND WHAT IS ITS PURPOSE? (2 PTS)
A HINGE IS THE UNCUT WOOD BETWEEN THE BACKCUT AND UNDERCUT. IT CONTROLS THE FALL OF A TREE UNTIL THE UNDERCUT CLOSES.

17. LIST TWO REASONS FOR USING A WEDGE WHEN FELLING A TREE OR SNAG. (4 PTS)
1. USE TO TILT THE TREE IN THE DIRECTION OF DESIRED FALL.
2. USED TO START A BALANCED TREE FALLING.
3. PREVENTS A TREE FROM SITTING BACK, THUS PINCHING THE SAW BLADE.
4. SAFETY AND CONTROL.

18. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (3 PTS)
1. LOOSE CHAIN.
2. REINSERTION OF A MOVING CHAIN INTO A PREVIOUSLY BEGUN CUT.
3. WHEN THE BAR NOSE COMES INTO CONTACT WITH AN OBJECT SUCH AS ANOTHER LOG OR LIMB.
4. STARTING A CUT WHILE SAW IS NOT UNDER FULL POWER.

19. DESCRIBE THE TWO CUTS YOU WOULD MAKE WHEN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (4 PTS)



20. DRAW AN ARROW TO INDICATE THE DIRECTION OF FALL FOR THE DIAGRAM BELOW, ASSUMING IT IS A BALANCED TREE. (3 PTS)

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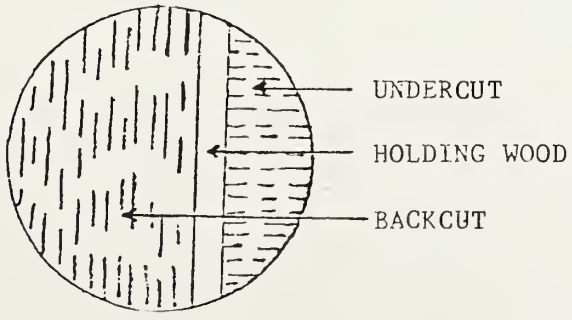
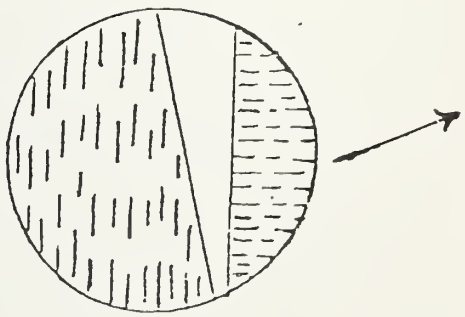




SCORE_____ NAME_____

CHAIN SAW TRAINING (WW-212B)

FINAL TEST

1. ILLUSTRATE THE CUTTER SHAPES FOR THE FOLLOWING SAW CHAINS. (6 PTS)

   1. CHISEL CHAIN

   2. SEMI CHISEL CHAIN

   3. CHIPPER CHAIN

2. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)

   1. CHISEL CHAIN

   2. CHIPPER CHAIN

3. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)

4. WHAT IS THE PURPOSE OF THE DEPTH GAUGES (RAKERS), AND HOW ARE THEY SET? (4 PTS)

5. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THEIR FUNCTION. (6 PTS)

   1.

   2.

   3.

6. CAN THE CARBURETOR ADJUSTMENTS BE MADE WITH THE AIR FILTER REMOVED AND STILL BE ACCURATE? (2 PTS)

7. DESCRIBE THE CORRECT POSITION OF A SAW FOR STARTING. (4 PTS)

8. DESCRIBE THE CORRECT METHOD FOR PULLING THE STARTER CORD FOR STARTING A SAW. (4 PTS)

9. LIST TEN FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (10 PTS)

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

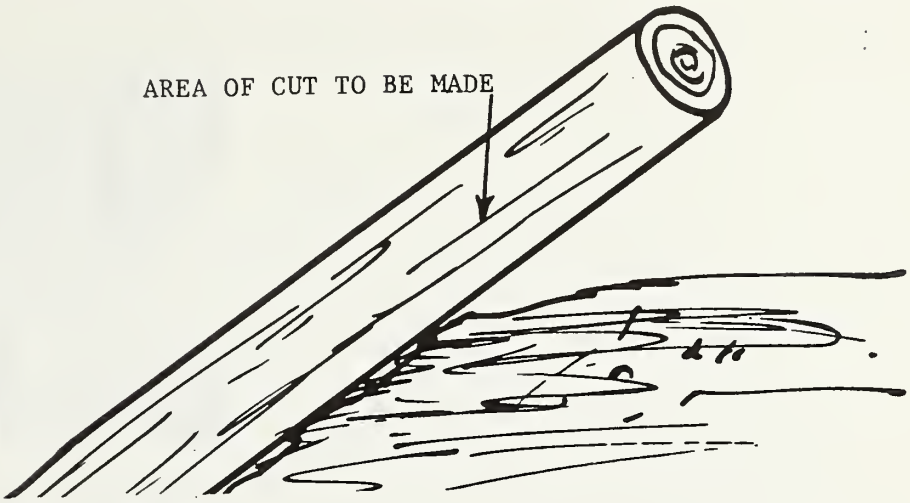
10. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (6 PTS)

1.

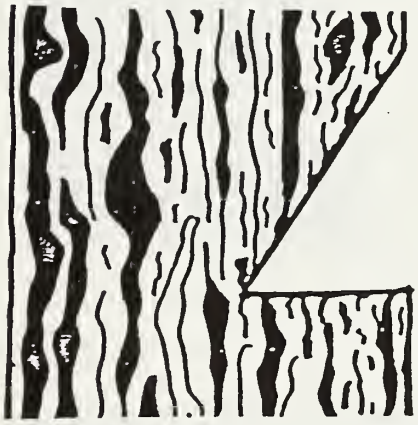
2.

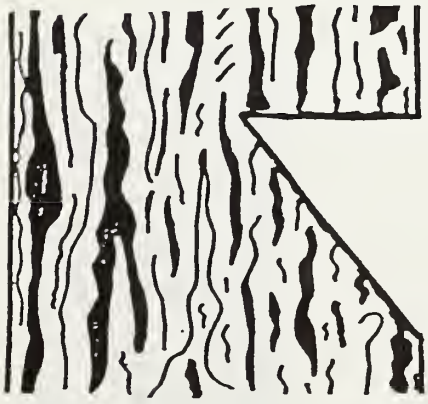
3.

11. DESCRIBE THE CUT(S) YOU WOULD MAKE IN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (10 PTS)

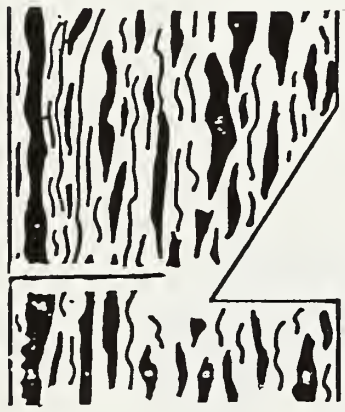


12. IDENTIFY THE TWO UNDERCUTS ILLUSTRATED BELOW AND EXPLAIN THE ADVANTAGES AND DISADVANTAGES OF EACH. (10 PTS)





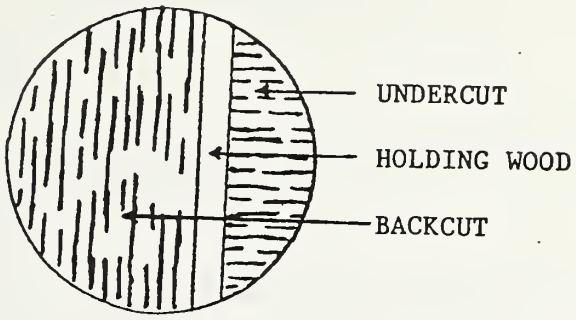
13. IDENTY WHICH OF THE TWO ILLUSTRATIONS BELOW IS CORRECT AND EXPLAIN WHAT WOULD OCCUR WHEN THE TREE FALLS USING THE INCORRECT METHOD. (10 PTS)

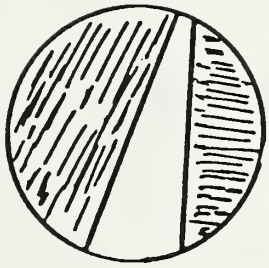


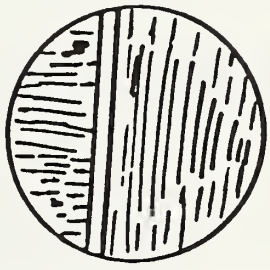
14. DESCRIBE WHAT WOULD OCCUR WHEN A TREE FALLS WITH AN UNDERCUT AS ILLUSTRATED BELOW. (6 PTS)

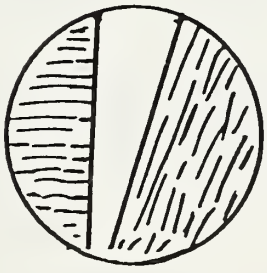
15. DRAW ARROWS TO INDICATE THE DIRECTION OF FALL FOR THE FOUR DIAGRAMS, ASSUMING EACH IS A BALANCED TREE. (16 PTS)

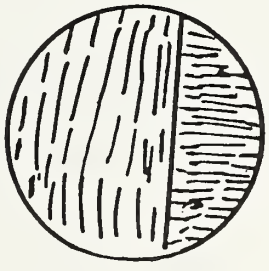
DIAGRAM KEY:











CHAIN SAW TRAINING (WW-212B)

FINAL TEST MASTER

1. ILLUSTRATE THE CUTTER SHAPES FOR THE FOLLOWING SAW CHAINS. (6 PTS)
   1. CHIPPER CHAIN ?
   2. SEMI-CHISEL CHAIN ?
   3. FULL CHISEL CHAIN ?

2. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)
   1. CHISEL CHAIN 30^{o}
   2. CHIPPER CHAIN 35^{o}

3. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)
   FROM THE INSIDE OF THE CUTTER TO THE OUTSIDE.

4. WHAT IS THE PURPOSE OF THE DEPTH GAUGES (RAKERS) AND HOW ARE THEY SET? (4 PTS)
   THEY REGULATE THE DEPTH OF THE CHIP THAT THE CUTTER REMOVES FROM THE WOOD. THEY ARE SET BY LAYING A DEPTH GAUGE GUIDE OVER THE CUTTER AND FLAT FILING TO THE DESIRED SETTING. THE CORNER IS THEN ROUNDED TO ALLEVIATE KICKBACK.

5. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THEIR FUNCTION. (6 PTS)
   1. LOW SPEED ADJUSTMENT: MIXES THE FUEL AND AIR FOR STARTING AND LOW SPEED OPERATION.
   2. HIGH SPEED ADJUSTMENT: MIXES THE FUEL AND AIR FOR PEAK PERFORMANCE AND POWER.
   3. IDLE ADJUSTMENT: REGULATES THE SPEED OF THE ENGINE OR THE AMOUNT OF FUEL ENTERING THE COMBUSTION CHAMBER AT IDLE.

6. CAN THE CARBURETOR ADJUSTMENTS BE MADE WITH THE AIR FILTER REMOVED AND STILL BE ACCURATE? (2 PTS)
   NO

7. DESCRIBE THE CORRECT POSITION OF A SAW FOR STARTING. (4 PTS)
   ON THE GROUND OR FIRM SURFACE, WITH BAR AND CHAIN CLEAR OF OBSTRUCTION.

8. DESCRIBE THE CORRECT METHOD FOR PULLING THE STARTER CORD FOR STARTING A SAW. (4 PTS)
   SHORT, SHARP PULLS.

9. LIST TEN FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (10 PTS)
   1. SPECIES; LIVE OR DEAD.
   2. SIZE; IS SAW LARGE ENOUGH FOR TREE?
   3. SOUNDNESS; ROTTEN, FORKED TOP, DEAD LIMB.
   4. DIRECTION OF LEAN; SLIGHT OR GREAT.
   5. HEAVY BRANCHES; LOPSIDED CROWN.
   6. WIND DIRECTION AND VELOCITY.
   7. NEARBY HAZARDS; TREES OR PEOPLE.
   8. SLOPE OF GROUND.
   9. ESCAPE ROUTE; CLEAR, AT RIGHT ANGLE TO FALL.
   10. SAFE WORKING AREA.

10. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (6 PTS)
    1. LOOSE CHAIN.
    2. REINSERTION OF A MOVING CHAIN INTO A PREVIOUSLY BEGUN CUT.
    3. WHEN THE BAR NOSE COMES INTO CONTACT WITH AN OBJECT SUCH AS ANOTHER LOG OR LIMB.
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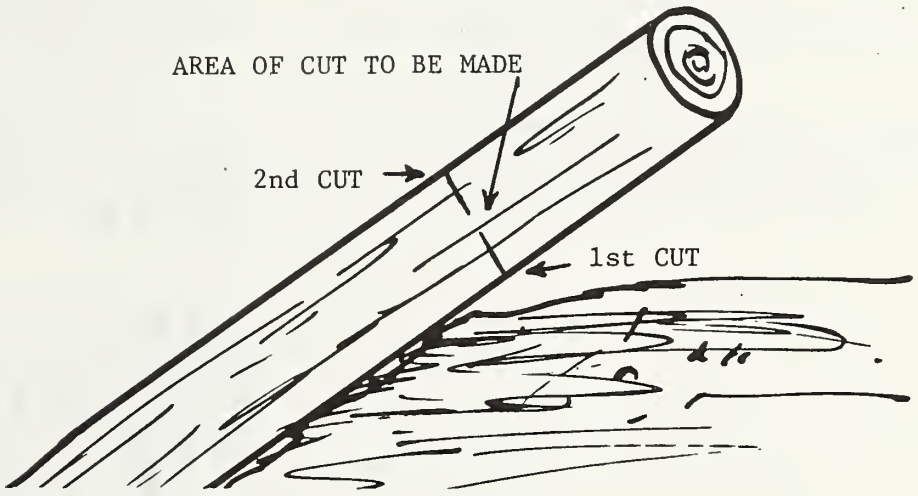
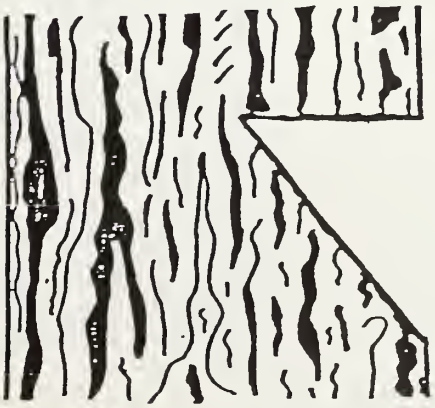
11. DESCRIBE THE CUT(S) YOU WOULD MAKE IN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (10 PTS)



12. IDENTIFY THE TWO UNDERCUTS ILLUSTRATED BELOW AND EXPLAIN THE ADVANTAGES AND DISADVANTAGES OF EACH. (10 PTS)

CONVENTIONAL

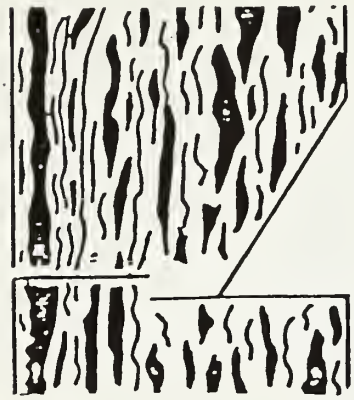
ALLOWS FALLER TO UTILIZE MORE OF THE TREE. MINIMIZES BREAKAGE WHEN TREE FALLS BECAUSE LOWER STUMPS ARE LEFT.



HUMBOLDT

MAY SERVE AS A ANTI-KICKBACK SAFETY VALVE. MINIMIZES BREAKAGE ON UNEVEN TERRAIN AS ALLOWS BUTT OF TREE TO SLIP TO GROUND FASTER.
LEAVES A HIGH STUMP.

13. IDENTIFY WHICH OF THE TWO ILLUSTRATION BELOW IS CORRECT AND EXPLAIN WHAT WOULD OCCUR WHEN THE TREE FALLS USING THE INCORRECT METHOD. (10 PTS)



INCORRECT METHOD

IF SAWN PAST SLOPING CUT ON ONE SIDE SIDE IT WILL SWING OR PIVOT TO THE HOLDING SIDE.

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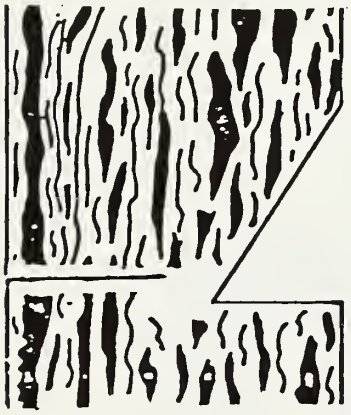
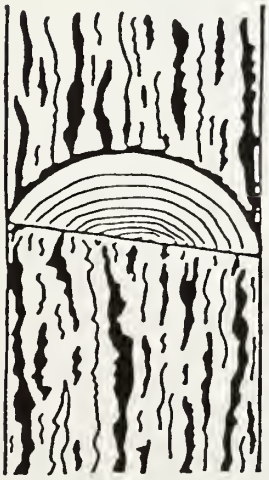


CORRECT METHOD

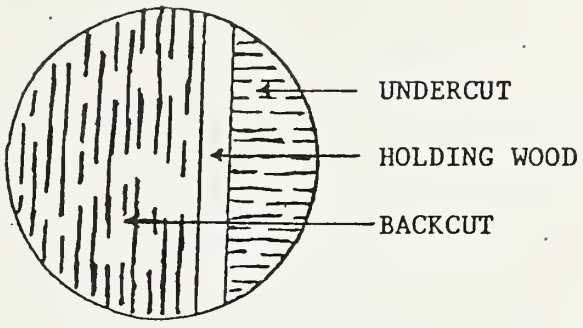
14. DESCRIBE WHAT WOULD OCCUR WHEN A TREE FALLS WITH AN UNDERCUT AS ILLISTRATED BELOW. (6 PTS)

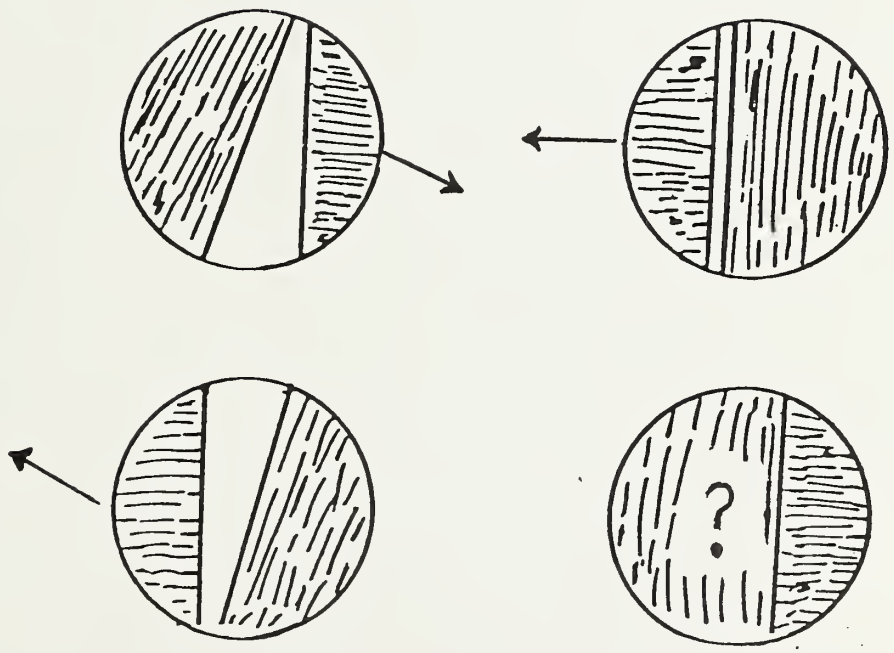


WHEN THE UNDERCUT (FACE) CLOSES THE ONE SECTION CLOSES MUCH FASTER THAN DOES THE OTHER SECTION. THE CLOSED SECTION ACTS AS A PIVOTING POINT. THE FALLING TREE ENTERS THE FACE AND IS HELD BY THE CLOSED SECTION, THEREBY SWINGING THE TREE TOWARD THE CLOSED SECTION.

15. DRAW ARROWS TO INDICATE THE DIRECTION OF FALL FOR THE FOUR DIAGRAMS, ASSUMING EACH IS A BALANCED TREE. (16 PTS)

DIAGRAM KEY:





CHAIN SAW TRAINING (WW-212C)

Course Agenda

Unit	Time
Introduction	1/2 hour
Review (optional)	1 hour
Practical Evaluation and Critique	5 hours

LESSON PLAN

COURSE : CHAIN SAW TRAINING (WW-212C)

TYPE : CERTIFICATION

UNIT : FULLY QUALIFIED FALLER CERTIFICATION

REFERENCES : PROFESSIONAL TIMBER FALLING FALLERS' AND BUCKERS' HANDBOOK
HEALTH AND SAFETY CODE FSH 6109.13

TIME : 8 HOURS

TRAINING AIDS: 16 MM PROJECTOR, DOUGLAS DENT FILMS #6, #8, #10 EASEL BOARD, FIRST AID KIT, CHAIN SAWS WITH ACCESSORIES, FIELD EXAMINATION CHECK LISTS, FIELD EXAMINATION SCORE SHEETS

OBJECTIVES:

UPON COMPLETION OF THIS COURSE THE TRAINEE WILL BE A FULLY QUALIFIED FALLER, CERTIFIED TO FELL AND BUCK MATERIAL OVER 24 INCHES DBH.

TIME	OUTLINE	KEY POINTS AND AID CUES
	I. INTRODUCTION	
	A. COURSE TITLE.	
	B. INSTRUCTOR INTRODUCTION.	
	C. TRAINEE INTRODUCTION.	
	D. REVIEW PRE-TEST.	
	E. COURSE OBJECTIVE.	
	F. COURSE AGENDA.	
	II. REVIEW (OPTIONAL)	
	A. SHOW THE DOUGLAS DENT FILMS.	DOUGLAS DENT FILMS #6, #8, #10
	B. DISCUSS.	

TIME	OUTLINE	KEY POINTS AND AID CUES
	III. PRACTICAL EVALUATION AND CRITIQUE EVALUATOR(S) WILL USE THE FIELD EXAMINATION CHECK SHEETS AND THE FIELD EXAMINATION SCORE SHEET FROM WW-212B TO INSURE THE PASSING CRETERIA IS MET. THE NUMBER OF TREES EACH PARTICIPANT WILL BE REQUIRED TO LIMB, BUCK AND FELL WILL BE DETERMINED BY THE EVALUATOR. THE CRITIQUE MAY BE CONDUCTED DURING OR AFTER THE PRACTICAL EVALUATION.	

TEST

SCORE_____ NAME_____

CHAIN SAW TRAINING (WW-212C)

PRE-TEST

1. ILLUSTRATE THE CUTTER SHAPES FOR THE FOLLOWING SAW CHAINS. (6 PTS)

    1. CHISEL CHAIN

    2. SEMI CHISEL CHAIN

    3. CHIPPER CHAIN

2. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS? (4 PTS)

    1. CHISEL CHAIN

    2. CHIPPER CHAIN

3. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)

4. WHAT IS THE PURPOSE OF THE DEPTH GAUGES (RAKERS), AND HOW ARE THEY SET? (4 PTS)

5. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THEIR FUNCTION. (6 PTS)

    1.

    2.

    3.

6. CAN THE CARBURETOR ADJUSTMENTS BE MADE WITH THE AIR FILTER REMOVED AND STILL BE ACCURATE? (2 PTS)

7. DESCRIBE THE CORRECT POSITION OF A SAW FOR STARTING. (4 PTS)

8. DESCRIBE THE CORRECT METHOD FOR PULLING THE STARTER CORD FOR STARTING A SAW. (4 PTS)

9. LIST TEN FACTORS THAT THE OPERATOR MUST SIZE UP BEFORE FELLING A TREE. (10 PTS)

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

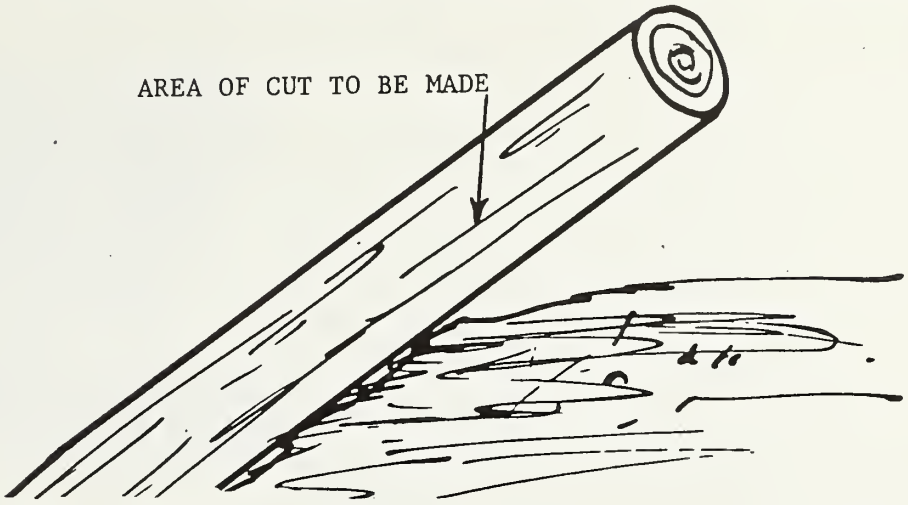
10. DESCRIBE THREE CAUSES FOR KICKBACK OF A CHAIN SAW. (6 PTS)

1.

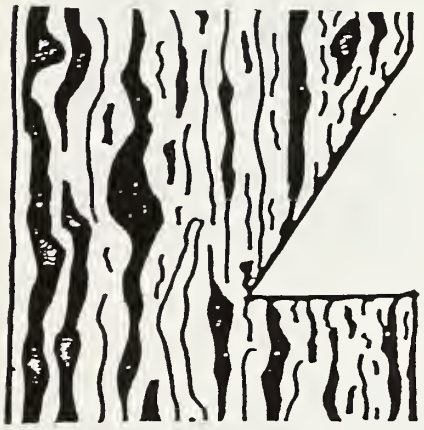
2.

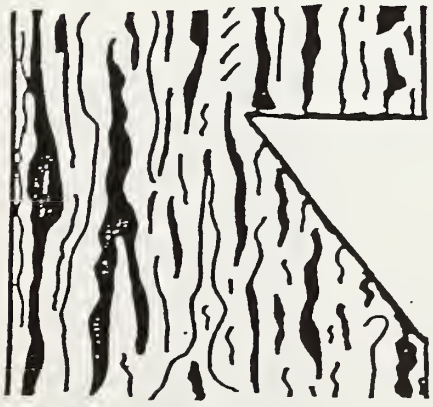
3.

11. DESCRIBE THE CUT(S) YOU WOULD MAKE IN BUCKING A LOG LAYING IN THE FOLLOWING POSITION BY DRAWING AND LABELING THE ORDER OF THE CUT(S). (10 PTS)



12. IDENTIFY THE TWO UNDERCUTS ILLUSTRATED BELOW AND EXPLAIN THE ADVANTAGES AND DISADVANTAGES OF EACH. (10 PTS)





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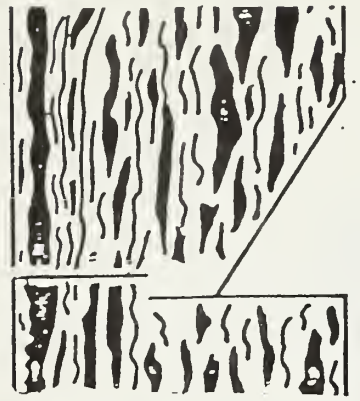
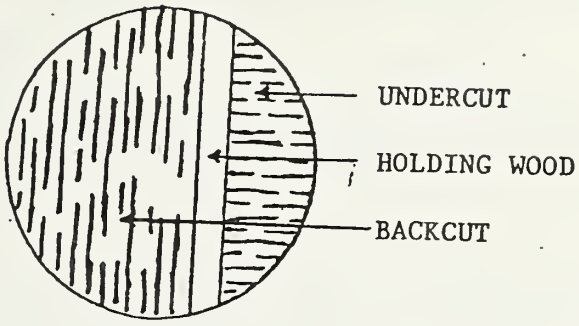
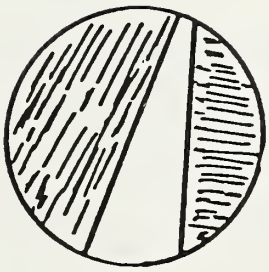


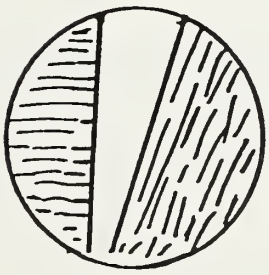
14. DESCRIBE WHAT WOULD OCCUR WHEN A TREE FALLS WITH AN UNDERCUT AS ILLUSTRATED BELOW. (6 PTS)

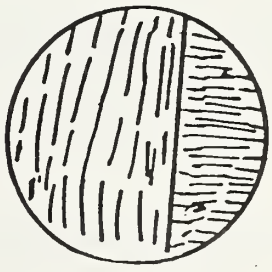
15. DRAW ARROWS TO INDICATE THE DIRECTION OF FALL FOR THE FOUR DIAGRAMS, ASSUMING EACH IS A BALANCED TREE. (16 PTS)

DIAGRAM KEY:









CHAIN SAW TRAINING (WW-212C)

PRE-TEST MASTER

1. ILLUSTRATE THE CUTTER SHAPES FOR THE FOLLOWING SAW CHAINS. (6 PTS)
   1. CHIPPER CHAIN
   2. SEMI-CHISEL CHAIN
   3. FULL CHISEL CHAIN

2. WHAT IS THE DEGREE OF ANGLE THAT THE TOPPLATE OF THE CUTTERS ARE FILED FOR THE FOLLOWING SAW CHAINS. (4 PTS)
   1. CHISEL CHAIN 30^{o}
   2. CHIPPER CHAIN 35^{o}

3. WHAT IS THE DIRECTION OF THE STROKE FOR FILING THE TOPPLATE OF THE CUTTERS? (2 PTS)
   FROM THE INSIDE OF THE CUTTER TO THE OUTSIDE.

4. WHAT IS THE PURPOSE OF THE DEPTH GAUGES (RAKERS) AND HOW ARE THEY SET? (4 PTS)
   THEY REGULATE THE DEPTH OF THE CHIP THAT THE CUTTER REMOVES FROM THE WOOD. THEY ARE SET BY LAYING A DEPTH GAUGE GUIDE OVER THE CUTTER AND FLAT FILING TO THE DESIRED SETTING. THE CORNER IS THEN ROUNDED TO ALLEVIATE KICKBACK.

5. LIST THE THREE CARBURETOR ADJUSTMENTS AND DESCRIBE THEIR FUNCTION. (6 PTS)
   1. LOW SPEED ADJUSTMENT: MIXES THE FUEL AND AIR FOR STARTING AND LOW SPEED OPERATION.
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8. DESCRIBE THE CORRECT METHOD FOR PULLING THE STARTER CORD FOR STARTING A SAW. (4 PTS)
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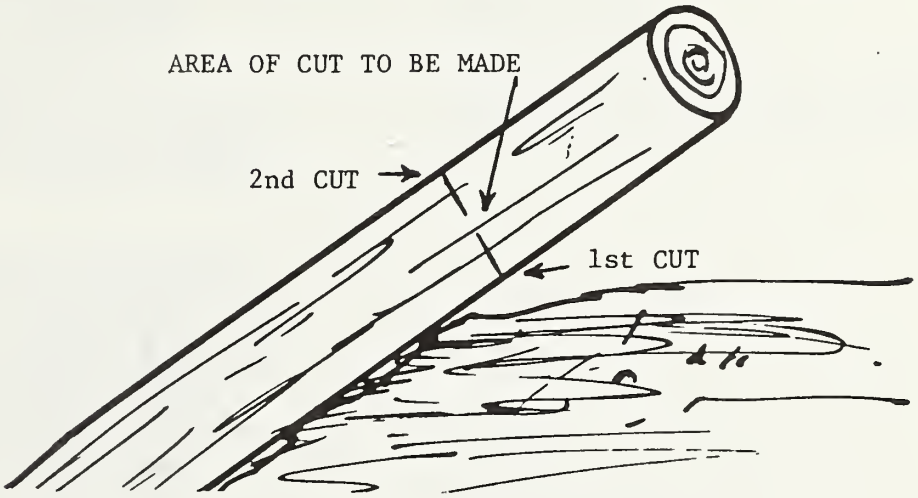

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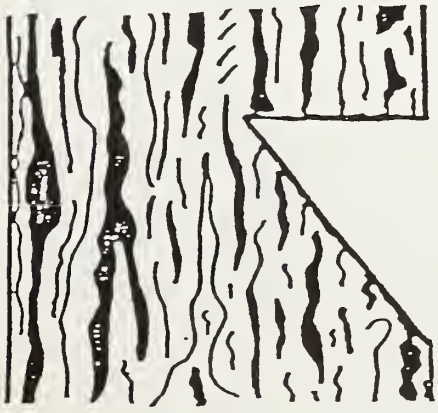

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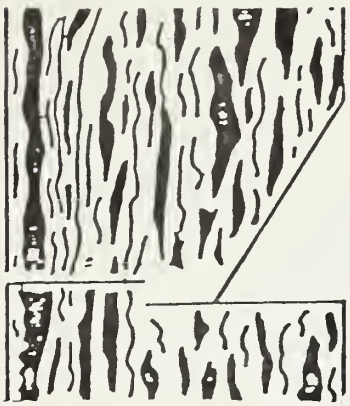

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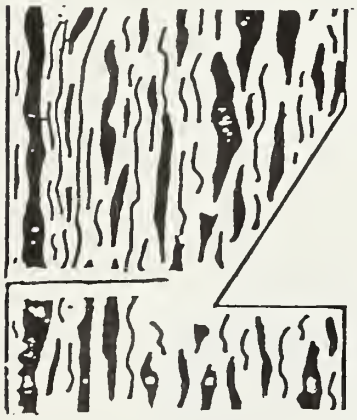

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